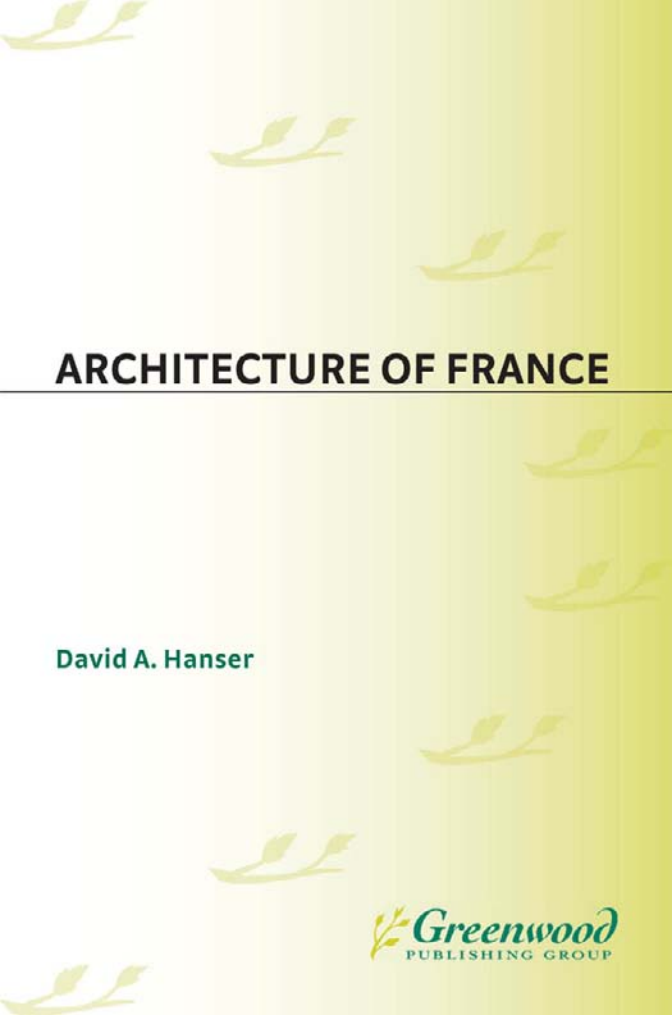


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All photographs provided by the author unless otherwise noted.

In memoriam

Mom and Dad
my brother Harris
my friends Betsy Holt and Hilde Wohlert

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Entries by Location

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Aigues-Mortes

Ancy-le-Franc

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Anet

Anet: Chateau

Arc-et-Senans

Royal Saltworks

Avignon

Palace of the Popes

Bordeaux

Grand Theater of Bordeaux (Grand
Théâtre de Bordeaux)

Bourges

Jacques Cœur House

Caen

Abbaye aux Hommes (Men's
Abbey)/St. Étienne

Carcassonne

Carcassonne (Fortress City)

Carnac, Brittany

Carnac Alignments

Prades, Catalonia

Saint Michel de Cuxa

Chartres

Chartres Cathedral (Notre Dame)

Burgundy

Fontenay Abbey

Fontainebleau

Fontainebleau: Palace

Saint Denis (Ile-de-France)

Saint Denis, Cathedral

Issoire

Abbey Church of St. Austremoine

Loire Valley

Chambord: Chateau

Chenonceaux: Chateau

Germigny-des-Prés: Parish Church

Maisons-Laffitte

Maisons: Chateau

Marseilles

Unité d'Habitation (Marseilles Block)

Melun

Vaux-le-Vicomte: Chateau

Mont Saint Michel, Normandy

Mont Saint Michel

Nîmes

Nîmes: Amphitheater

Nîmes: The Maison Carrée

Pont du Gard

Orange

Orange: Roman Theater and Tri-
umphal Arch

Paris

Arab World Institute

Arc de Triomphe (Arch of Tri-
umph)

Sacré Cœur (Basilica of the Sacred
Heart of Christ)

Bibliothèque Nationale François
Mitterrand

Bibliothèque Ste-Geneviève

Eiffel Tower

Grande Arche (Grand Arch)

Hôtel Soubise

Invalides

Les Halles (Central Markets)

Louvre and Tuileries Garden

Madeleine

Metro (Subway) Stations

Notre Dame

Panthéon

Paris Opera (Palais Garnier)

Place de la Concorde and Gardes

Meubles

Place des Vosges

Pompidou Center

Sainte-Chapelle

Théâtre des Champs-Élysées

Val-de-Grâce

Périgueux

Saint Front

Poissy

Villa Savoye

Poitiers

Baptistery of St. Jean (St. John)

Reims

Reims Cathedral (Notre Dame)

Saint-Savin-sur-Gartempe

Saint-Savin

Compiègne

Pierrefonds: Chateau

Toulouse

Saint Sernin

Tournus

Saint Philibert Abbey Church

Tours

Villandry: Chateau and Gardens

Versailles

Versailles: Chateau

Versailles: City and Gardens

Versailles: The Hamlet (L'Hameau)

Versailles: Petit Trianon

Vézelay

Vézelay: Church of the Madeleine
(Mary Magdalene)

Entries by Architectural Style and Period

See the Introduction for descriptions of major architectural styles and periods in French history.

Prehistoric

(10,000 B.C.E.–50 B.C.E.)

Carnac Alignments

Roman (50 B.C.E.–300 C.E.)

Nîmes: Amphitheater

Nîmes: The Maison Carrée

Orange: Roman Theater and Tri-
umphal Arch

Pont du Gard

Early Christian

(300 C.E.–1,000 C.E.)

Baptistry of St. Jean (St. John)

Carolingian (800 C.E.–1,000 C.E.)

Germigny-des-Prés: Parish Church

Romanesque (950–1200)

Fontenay Abbey

Issoire: Abbey Church of St. Aus-
tremoine

Saint Front (Périgueux)

Saint Savin

Saint Sernin

Saint Michel de Cuxa

Saint Philibert Abbey Church

Romanesque and Gothic

(950–1250)

Mont Saint Michel

Vézelay: Church of the Madeleine
(Mary Magdalene)

Abbaye aux Hommes (Men's
Abbey)/St. Étienne

Gothic (1130–1550)

Aigues-Mortes

Palace of the Popes

Carcassonne

Chartres Cathedral (Notre Dame)

Jacques Cœur House

Louvre and Tuileries Garden

Notre Dame

Pierrefonds: Château

Reims Cathedral (Notre Dame)

Sainte-Chapelle

Saint Denis

Renaissance (1510–1660)

Ancy-le-Franc: (Chateau)
Anet: Chateau
Chambord: Chateau
Chenonceaux: Chateau
Fontainebleau: Palace
Place des Vosges
Villandry: Chateau and Gardens

Baroque (1640–1750)

Invalides
Maisons: Chateau
Val-de-Grâce
Vaux-le-Vicomte: Chateau
Versailles: Chateau
Versailles: City and Gardens

Rococo (1730–1760)

Hôtel Soubise

Neoclassical (1750–1830)

Arc de Triomphe (Arch of Triumph)
Grand Theater of Bordeaux
Louvre (East Façade)
Madeleine
Panthéon
Place de la Concorde and Gardens
Meubles

Royal Saltworks
Versailles: Petit Trianon

**Romantic/Picturesque
(1770–1790)**

Versailles: The Hamlet
(L'Hameau)

**Nineteenth Century/Beaux-Arts
Eclecticism (1830–1920)**

Bibliothèque Ste-Geneviève
Eiffel Tower
Les Halles (Central Markets)
Paris Opera (Palais Garnier)
Sacré Cœur (Basilica of the Sacred Heart of Christ)

**Modern and Postmodern
(1905–present)**

Arab World Institute
Bibliothèque Nationale François Mitterrand
Pompidou Center
Grande Arche (Grand Arch)
Unité d'Habitation (Marseille Block)
Metro (Subway) Stations
Ronchamp (Notre-Dame-du-Haut)
Théâtre des Champs-Élysées (Paris)
Villa Savoye

Preface

Like the other books in Greenwood's Reference Guides to National Architecture series, *Architecture of France* is intended to be accessible for readers who have no special knowledge of architecture, engineering, or history, while remaining interesting to those who have a background in architectural studies. Architectural "jargon" has, therefore, been reduced to a minimum, although some must remain. Architecture, like all other fields of study, has a special vocabulary that is useful or even necessary in discussing buildings. These specialized terms will be used only when they are critical to understanding a specific building or when their elimination would require tortuous and repetitive descriptive phrases. Where practical, such terms are briefly explained the first time they appear in an entry. Terms unique to architecture that are not explained in the text are italicized (e.g., *flying buttress*) and explained in a glossary at the back of the book.

Even though buildings from all major historical periods are represented, *Architecture of France* is more like an encyclopedia of French architecture than a history of architecture. The introduction has been designed to give at least an overview of major historical building styles and how they relate to the political history of France. As in an encyclopedia, entries are meant to be self-contained; that is, they are intended to make sense to a reader who has not read the entire book. Each entry begins with pertinent factual data about the building: location, architectural style(s), dates of original construction and important reconstructions, and names of architects or engineers. The opening paragraph also explains why the structure is important. To keep individual entries from being overly long and repetitive, some aspects of a building type may be discussed in more detail in one entry than in another. Where this is the case, a cross-reference, indicated with **boldface** type, directs the reader to an entry that gives a fuller explanation.

For the most part, the buildings covered in this book are those most likely

to be familiar to the general public, for example, buildings that often appear in the background on television or in movies, operas, and musicals (e.g., the **Eiffel Tower**, the **Arc de Triomphe**, or the **Paris Opera**); or are mentioned in popular books and magazines (e.g., **Notre Dame**); or are among those most visited by tourists (e.g., **Versailles**). As a consequence, and because nearly one of five French citizens live in the capital city, a disproportionate number of buildings are located in or near Paris. Selection criteria combined with the publisher's restrictions on the size of the book have resulted in eliminating some works of superior aesthetic or historical importance while including better-known buildings of lesser merit. On the other hand, because of the effort to achieve a degree of chronological and geographic balance, some structures not likely to be known to the general public are discussed, such as the Early Christian **Baptistry of St. Jean** in Poitiers and the Carolingian chapel of **Germigny-des-Prés**. Perhaps this book will inspire some readers to visit these lesser-known buildings.

For the same reason as the selection of buildings most likely to be familiar to the general public, buildings are listed alphabetically by the name the public most commonly uses. For the American public, "Notre Dame," when it is not used to refer to a football team, almost universally is understood to refer to the cathedral in Paris. The cathedral in the city of Chartres, which is also dedicated to the Virgin Mary (Notre Dame), is called **Chartres Cathedral** by nearly everyone, even in France, and is therefore listed under that name. It seemed less confusing to list major buildings in Paris by their popular name rather than under "Paris," but all the buildings at Versailles appear under the term "Versailles." Tables at the beginning of the book that break down the entries by location, architectural style and general time period, and the index, permits readers with any information about a building to find where (and whether) it is covered in the book.

French architects, especially from the High Middle Ages on, have been world leaders in advancing construction techniques; French architects and engineers invented modern civil and architectural engineering. In many cases, expression of the building's structure is central to its aesthetic appeal. Knowing how French buildings were constructed—what makes them stand up—is more important to understanding them than it is for buildings in many other countries. A French Gothic cathedral, for example, is an undisguised skeleton of cut stone, whereas St. Peter's Basilica in Rome, which looks like a stone building, is mostly a "concrete" structure covered with stone veneers; apparent structural details (like *pilasters*) are decorative. Such discussions of structure and construction are kept as brief and simple as possible, but they are important.

Architecture is a spatial and temporal art; to be understood in a more than superficial way, a building must be walked around and through, which takes time. Nothing substitutes for direct experience of any work of art, but a single photograph of a painting and two or three of most sculptures give a far better impression of these works than multiple photographs and drawings of a

building. Budget limitations, however, restricted illustrations to no more than one per building, and difficult decisions had to be made. Chartres Cathedral, for example, looks very different from the front, sides, and rear; moreover, its interior is hardly what one would expect from the exterior. There should be photographs of all these parts—and of the stained glass, one of its glories—but there can be only one image. To mitigate the problem, different aspects of buildings in a general category (such as Gothic churches) are shown for different examples, and cross-references are given so that readers can build up a better understanding of the building type.

A comment needs to be made about stylistic categories. Although some experts object to categorizing buildings (or other works of art) with stylistic labels, buildings from different periods do look different from each other. Buildings from a historical period have characteristics that distinguish them from buildings of a different period. Thirty-five years of teaching have convinced me that describing these stylistic characteristics helps the nonexpert understand buildings, paintings, sculpture, and music. Nothing more should be made of stylistic labels in this book than an attempt to help the reader divide 5,000 years of buildings into smaller, more manageable chunks, much as cutting up a tree into studs, joists, and beams aids considerably in building a house as opposed to leaving the tree as it grew in the forest.

Although I cannot claim expertise in such a long span of architectural history as is covered in this book, at least I have visited every building discussed, many of them several times—even **Les Halles** in Paris, the single building included that no longer exists.

With the exception of the megaliths at **Carnac**, all the buildings in this book were constructed during the Christian era; B.C.E. is appended to dates before the Christian era and C.E. to those of the Christian era only when leaving them out might make a date ambiguous.

Suggestions for further reading are given at the end of each section, but with the exception of books on Gothic architecture and Versailles, there are surprisingly few English sources that go into greater depth for many of these buildings than does *Architecture of France*. Some French sources are indicated for readers who know that language. A Web site is given for some buildings, but this is mostly to suggest sources of images of the building, especially images in color. Texts on the Internet vary widely in quality and accuracy, and most are in less depth than the entries in this book. A brief bibliography of important general sources or classic works is found in the back of the book.

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Acknowledgments

The late Alan K. Laing was fundamentally responsible for my interest in French architecture—in architectural history tout court—and he was instrumental in my being appointed to the faculty of the University of Illinois School of Architecture's European program at Versailles, France. This program, which is associated with one of the first three schools of architecture established in France after the dissolution of the *Ecole des Beaux-Arts* in 1968, was an essential part of my studies of architectural history. Alec Notaras, who directed the American program for its first two decades, and Jean Castex and Henri Bressler, two of the outstanding faculty of the French school have seen, since my earliest days at Versailles, Notaras, who were not only valued colleagues and good friends, but also learned guides to French architecture. It is impossible to overestimate how much the late Hélène and Michel Bonnaud contributed to my knowledge of all things French. They adopted me into their family, helped me to obtain a house near theirs in central France, and bequeathed me their three children as continuing ciceronies. Sylvie and her husband Philippe in particular assisted me at critical points in the book. Marie-Annick Matovic, longtime Executive Assistant at the University of Illinois' European Program in Versailles, has helped in so many ways over the last decades; as has Dominique Audouin, her equivalent in the French school of architecture.

Whatever qualities I have as a scholar I owe to the superb art and architectural history faculty who directed my graduate studies, chief among them Dr. Marcel Franciscano. Marcel guided me through the long process of getting a doctorate and became a very good friend in the process. The late Dr. Minerva Pinnell inspired as well as taught me, as did Dr. Ann Perkins. Lively discussions and visits to Renaissance and Baroque architecture with Dr. Richard Betts sharpened my critical abilities.

Many of the buildings discussed in the book were first visited with the late

Larry Perkins on the many sketch trips we conducted for the Illinois students; sketching is, I believe, as invaluable a tool for the architectural historian as it is for the designer. Professor Cheryl Morgan assisted with taking most of the photographs, occasionally serving as tripod, and made numerous suggestions for the organization of this book. Randy Seitsinger, Head of Oklahoma State University School of Architecture, has been unwavering in his support of this project. Many other colleagues have also offered advice or read parts of the manuscript and listened to complaints. Chief among these have been Dr. George Jewsbury and Dr. Janina K. Darling, who helped with editing and gave useful criticism. Special thanks is owed to Dr. Randi Eldevik, who read every word of the manuscript before it was sent to the editors at Greenwood and made substantial improvements in the manuscript. Thanks are due also to John Wagner, Senior Development Editor at Greenwood, who has been very patient with this author, and Shelley Yeager, Production Editor for the book, who found numerous ways to make my prose clearer. No one but me, however, is responsible for any errors or infelicities.

Introduction

The Architecture of the “Hexagon”

The French frequently refer to their country as “the hexagon.” This is an acknowledgment of France’s natural boundaries: the English Channel, the Atlantic Ocean, the Pyrenees, the Mediterranean, the Alps, and the Rhine. Until the seventeenth century, there was not much unity within the hexagon; France had nothing approaching a strong central government or common language—much less a characteristic style of architecture. Until then, the hexagon was, at various times, a loose confederation of preliterate tribes, an integral part of the Roman Empire, and a collection of countries, each with its own dialect or language that might be only remotely related to the French language (e.g., Breton) or even completely unrelated to French (e.g., Basque). In the latter half of the seventeenth century, the government of Louis XIV, France’s most powerful monarch, brutally imposed not only a uniform political system, but also a common language and a relatively uniform architectural style. For these reasons, Louis XIV’s reign (1643–1715) divided the architecture of France into two large categories.

Like the Romans and Greeks, the seventeenth-century French observed that architecture, like language, has a vocabulary, a syntax, and a grammar that are used to convey meaning. Imposing a uniform architecture was part of the same policy as assuring a uniform language. Except when the hexagon was part of the Roman Empire, French architecture before the reign of Louis XIV was extremely diverse, varying significantly from region to region in style, materials, and methods of construction, even within the same time period. Starting with Louis’s reign, these regional variations became less pronounced, a process of homogenization that increased with the introduction of industrial materials and processes late in the eighteenth century. Thereafter, commercial and civic structures in modern France, as in the rest of the

industrialized world, showed remarkably little regional variation. Differences still survived in domestic architecture, but increased industrialization in residential construction also reduced regional stylistic differences in housing.

French Culture and Politics before the Reign of Louis XIV

Even though no buildings survive from prehistoric France (c. 30,000 B.C.E.), the superb paintings in caves such at Lascaux, Chauvet, and elsewhere indicate that the artistic level of the earliest inhabitants was high. The first monumental constructions in France were the monoliths, groupings of large stones scattered over parts of the country, indeed over parts of Europe as a whole. No one knows precisely why or when these stones were erected, but some, at least, are probably older than the pyramids of Egypt. The largest groupings of these stones are at **Carnac** in Brittany; great fields of them are arranged in parallel rows, some of which extend a mile or more. These alignments of monoliths were ancient when the Celts arrived in France in the sixth century B.C.E. Celtic culture, about which our knowledge is also woefully inadequate, was dominant in France before the Romans conquered the region. The Celts, however, did not have a written language, so we have nothing from them describing their culture, and Roman reports are undependable, being either hearsay or blatant propaganda. Only traces of their buildings survive, even though there were Celtic cities, such as Alesia in Burgundy. Greeks established colonies in southern France, but only traces of their buildings survive, as well.

With the Roman conquest of the hexagon in the first century B.C.E., the Celts—whom the Romans considered to be uncivilized—were effectively assimilated into the Roman Empire, and their culture largely disappeared. France became as much a part of the Roman Empire as Illinois is a part of the United States. This transformation can be seen in Massalia, which was founded by the Greeks about 600 B.C.E. on the site of the modern city of Marseilles. In 125 B.C.E., its citizens asked the Roman army to protect them from attacking Celtic tribes. The Romans did, but they stayed on and came increasingly to dominate culture in southern France. Julius Caesar conquered the rest of the hexagon between 59 and 49 B.C.E. For the next two or three centuries, structures in France were almost indistinguishable from those on the Italian peninsula. For example, the **Nîmes** amphitheater is comparable in quality, though not in size, to the Colosseum, and the **Maison Carrée** in the same city is the equal in quality to the temples in the Roman Forum; It is the best preserved of all Roman temples. Similarly, the theater in **Orange** is one of the finest and best-preserved Roman theaters, and the **Pont du Gard** is perhaps finer in construction and a more sophisticated piece of engineering than the aqueducts of Rome itself. Luxurious villas, which any Roman would have found comparable to those in Italy itself, dotted the French countryside. The largest, oldest, richest, and most powerful cities in

Roman Gaul (as France was known to the Romans) were in Provence, in southeastern France. Roman tombs, aqueducts, temples, theaters, amphitheaters, and other structures are better preserved here than elsewhere in the hexagon.

With the gradual decay and dissolution of the Roman Empire between the fourth and seventh centuries, large, well-established Roman cities like Nîmes, Lyons, Vienne, and Vaison-la-Romaine were mostly abandoned. During this period, the Western Roman Empire was overwhelmed by waves of Germanic immigrants and invaders from northern and central Europe. Roman buildings that were not destroyed in these invasions fell into ruin or were dismantled to build defensive walls. Centralized government eventually broke down completely, without which neither roads nor aqueducts could be maintained, and citizens could not be adequately defended against invaders who coveted the wealth concentrated in the cities. By the eighth century, elegant cities of 80,000 inhabitants or more, such as Durocortorum (modern **Reims**), became hamlets of a few hundred inhabitants. The advanced building technologies developed under the Roman Empire were lost for several centuries.

The characteristic identities of the component parts of France developed during the next 500 years during the transition from Roman province to modern nation-state. The region around Paris, traditionally called the **Ile-de-France** (“the Island of France”), was the only part of the hexagon directly controlled by the kings of France in the year 1000. It was scarcely more than 60 miles across in any direction during much of the Middle Ages and was surrounded by other political entities. Its inhabitants, as well as many of the peoples in the hexagon north of the Loire River, spoke a language closely related to modern French, but to the northeast, in Alsace and Lorraine, the inhabitants spoke German (as many still do), and the culture, including the architecture, resembled that of the adjoining German nations. The inhabitants of the western corner of the hexagon, Brittany, spoke Breton, a Celtic language closely related to Welsh in Great Britain but virtually unrelated to French. Breton culture, including architecture, was correspondingly unique. Normandy, to the northeast of Brittany, was settled by Viking invaders—the Norsemen. The Normans conquered England in 1066, and, as a result, the Norman and English aristocracy were united by blood, a situation that led to political friction and frequent Anglo-French wars. At times, especially during the twelfth century, the borders of lands claimed by the English Crown were as close as 40 miles from the center of Paris.

Most of the region south of the Loire River was known as Languedoc, “the country where ‘yes’ is pronounced ‘oc’—as opposed to ‘oil’ in the north.” Languedoc was the region most thoroughly integrated into the Roman Empire and remained the most influenced by Roman culture. The language spoken, Occitan, was closer to Latin and Italian than to the French spoken in the north and, at least until the seventeenth century, the architecture was closer to that of the ancient Roman Empire than to that in the north. The tradi-

tional Basque region in the southwest corner of the hexagon is the major exception to these generalizations about Languedoc. It overlaps the present borders of France and Spain and is unique in many ways, not least because the Basque language is related to no other language spoken in France, neither Celtic, Occitan, French, nor German.

For nearly five centuries, with the exception of the reign of Charlemagne (768–814), civilization in the strictest sense of the word, that is, a culture based on cities, nearly disappeared in France. Architecture, the art form most dependent on cities, declined proportionately. Except in some of the communities near the Mediterranean Sea, most buildings were small, crude, and amateurishly built. From the architecture of the fifth through the tenth centuries, scarcely more than parts of walls and foundations survive. Charlemagne gave a rough unity to France and other parts of northern Europe and attempted to revive Roman art, literature, and architecture. These attempts only weakly survived his death, however, and France, along with the rest of Charlemagne's "empire," fell back into small principalities that waxed and waned in size and power depending on inheritances, marriage, political alliances, and Viking and Moorish raids.

Despite these difficult conditions, the Early Middle Ages saw the introduction of Christianity into Gaul, beginning with the conversion of the Merovingian leader, Clovis (481–511). Since Clovis and his people were Franks, the name "France" began to replace the name "Gaul" for the entire region. Churches and other sacred structures (e.g., the **Baptistry of St. Jean** in Poitiers) were among the few significant structures built during this period. Most of them have disappeared, however, or survive only as foundations under more recent buildings, for example, in the crypt of the cathedral at **Saint Denis**. Charlemagne attempted to reestablish ancient Roman standards of building construction as part of his effort to reconstitute the Western Roman Empire. A few *Carolingian* (the descriptive term for this period) buildings exist in part or whole, although in altered form, most notably **Germigny-des-Prés**.

In architecture, the High and Late Middle Ages lasted from about 1000 to about 1500. Around the year 1000, the economy of France improved dramatically, which promoted a general sense of well-being. Monasteries flourished, cities began to grow again, and in them a new group of merchants and craftsmen emerged who would come to be known as the bourgeoisie. Trade returned to create a moneyed economy. Due in part to the popularity of pilgrimages to religious sites and in part to the Crusades, which began in France, the High Middle Ages saw a prodigious amount of monumental building and technological innovation in both secular and religious architecture. Architectural historians conventionally divide the High Middle Ages into the *Romanesque* and *Gothic* styles of architecture, which are differentiated by both formal and technical qualities. Romanesque is characterized by a revival of large-scale masonry construction and the rediscovery (or reinvention) of lost Roman building techniques and forms (thus the term Ro-

manesque), some of which the crusaders and pilgrims learned from the Muslims, who had kept them current. Early in the Romanesque period, few highly skilled craftsmen were available—or needed—in the construction of churches and monasteries. Often, the builders were the monks themselves and the lay brothers or the soldiers attached to castles. Because of the use of unskilled or semiskilled labor, and because unsettled political conditions required defensive features in nearly all but peasant structures, Early Romanesque buildings tend to have relatively thick walls, few and small windows, and, consequently, relatively dark interiors. However, because of regional experimentation, there are many exceptions to these generalizations in Early Romanesque churches. With increasing size and as France's economy improved, churches and castles became structurally and technically more complicated. Huge Romanesque churches built late in the period, pilgrimage churches such as **Saint Sernin** in Toulouse, St. Foy in Conques, and the Church of the Madeleine in **Vézelay**, required highly trained, specialized groups of craftsmen for their construction.

Monasteries, which had dominated the intellectual life during the Romanesque period, lost economic and political power to the cities during the French Gothic period. They competed to build the largest and most splendid churches, much as cities today compete to build the tallest skyscraper. Beauvais Cathedral (St. Etienne) had a central tower (since disappeared) taller than a modern fifty-story skyscraper, which indicates how far the technical prowess of the architects and masons had come. Most French Gothic churches are immediately recognizable, offering gravity-defying stone skeletons surrounded by a forest of freestanding buttresses connected to the body of the building by flying arches (*flying buttresses*). Tall, pointed arches replace (for structural reasons) the squatter round arches that characterize Romanesque architecture, and delicately ribbed vaults replace the thick, barrel-shaped vaults that covered the interiors of Romanesque churches. Because of this sophisticated skeletal structure, Gothic architects could create outer walls of jewellike stained glass instead of the thick walls and small windows of Romanesque churches.

Little domestic or defensive architecture from the Early Medieval period survives because most of it—even castles—was built of wood and earth, and also because most structures were replaced by larger and more “modern” constructions in succeeding centuries. By the twelfth century, however, masonry construction was used for fortresses, and whole fortress-cities such as **Aigues Mortes** and **Carcassonne** have come down to us largely intact. Aristocratic manors were in many respects indistinguishable from castles during the High Middle Ages. Almost all structures, except those obviously built only as residences, were abandoned with the introduction of gunpowder, and those that remained were intentionally ruined, especially by Louis XIII and his advisors, to put an end to the feudal system. **Pierrefonds**, which was restored in the mid-1800s, gives an idea of a castle from the end of the Middle Ages, although its restoration is as fanciful in some places as it is accurate in

others. Numerous half-timbered medieval houses survive in cities like Troyes, Strasbourg, and Dinan. The most important and impressive surviving example of upper-middle-class, that is, nonaristocratic, stone medieval residences is the **Jacques Cœur House** in Bourges.

The extraordinary number of great and small churches that were built in France between the mid-1000s and 1500 is a testament to both the efficiency of Gothic building techniques and the wealth and power of France. Gothic churches were built surprisingly quickly as long as there was sufficient money to pay the workers, whose wages were comparable to those of modern counterparts; despite the legends, none of the Gothic cathedrals was built with volunteer labor. If it took centuries to complete some Gothic churches, it was because it took that long to amass enough money to build them. Only a few decades of actual building were required to erect even the largest cathedral.

A late, lacy style of Gothic architecture, called *Flamboyant* because of the flamelike stone tracery in windows, developed during the Late Middle Ages. This style lasted until after 1500 in France, well after the Renaissance arose in Italy. During the late fifteenth and early sixteenth centuries, French kings became aware that Italians had developed a new style of architecture based on a revival, a rebirth (“renaissance” in French), of ancient Roman architecture, that is, a revival of archeologically accurate forms and details from Roman architecture—Romanesque architects had only approximated ancient usage. When King François (Francis) I (r. 1515–1547), who had been held hostage in Italy, returned to France, he hired some of the most famous Italian artists and architects of the period, including Leonardo da Vinci, to come to France to demonstrate this new “Renaissance style” to French builders and craftsmen. These Italians advised on the construction, decoration, and furnishing of numerous princely dwellings in the Loire Valley, which François made the center of French government for several years. Although *châteaux* (large country manors) such as Azay-le-Rideau, **Chenonceaux**, or **Chambord** showed this new Italian Renaissance influence, the workmen, trained in the old Gothic style, still often freely interpreted the imported motifs and used traditional French methods of construction and composition. Only **Ancy-le-Franc** was designed in its entirety by an Italian architect, Sebastiano Serlio. Otherwise, buildings from the early sixteenth century, while no longer medieval in appearance, have a unique French character; Ancy itself could never be mistaken for a building in Italy. Before the end of the sixteenth century, French architects and craftsmen had assimilated the canonical Italian Renaissance style in detail, although in construction, planning, and overall massing, their buildings remained characteristically French.

Architecture from Louis XIV to the French Revolution

Louis XIV and his advisors, especially Jean-Baptiste Colbert, used architecture as a political tool, both as propaganda and as an instrument for cen-

tralizing power in the person of the king. By commissioning important buildings, for example, the East Facade of the **Louvre**, and by setting up an academy to codify rules of architecture and teaching them to carefully chosen architects, Louis and Colbert brought into being a new architectural style. They effectively imposed this style, which the French call “classicism,” on all public buildings in France. In the beginning more grandiose than grand, the style not only symbolized Louis as the absolute monarch of the first nation-state in modern times, it also communicated to the world that France was the richest and most powerful country in Europe. A new French capital city, **Versailles**, entirely built according to the new criteria, had the most influence. It served as a model not only in France, but, eventually, all over the Western world, from Washington, D.C., to Potsdam and St. Petersburg. Regional styles survived mainly in small and private buildings.

With the death of Louis XIV in 1715, architecture became less grand, less formal, lighter, more delicate, and more feminine, reflecting the increased influence of women in the court of his great grandson, Louis XV. The oval salon of the **Hotel Soubise** is perhaps the best surviving example of this Rococo style, but there are also excellent Rococo interiors in the Palace of Versailles, and the public squares in the eastern city of Nancy are masterpieces of the Rococo style applied to urban design. Gradually, this frivolous but delightful approach gave way to the more severe and restrained Neoclassicism of the architect Ange-Jacques Gabriel, whose **Petit Trianon** at Versailles and **Place de la Concorde** in Paris are masterpieces, respectively, of Western architecture and urban design.

Just before the outbreak of the French Revolution in 1789, architecture began to reflect the mathematical and scientific advances of the Enlightenment (or Age of Reason). In the **Panthéon** in Paris, the architect Soufflot and his engineering consultants used accurate scientific formulas for the first time to calculate precisely the magnitude and direction of the structural forces within the building and conducted scientific experiments to find out the precise strengths of the construction materials used to resist concentrated building loads. As a result, the Panthéon was built with an unprecedentedly small amount of building material compared to the great volume of space it contained. This more scientific approach to architecture and engineering eventually resulted in modern buildings like skyscrapers and the vast factories and warehouses we build today. Some architects began to become involved not only with industrial buildings, but also with the industrial processes contained within them. At the **Royal Saltworks**, for example, the architect Ledoux designed not only the buildings, an ideal worker's community which he based on the most advanced social theories of the time, but also the machinery and industrial processes used for refining salt. At the other extreme, architects of other buildings, most importantly the contemporary Désert de Retz and, at Versailles, the **Hamlet**, rejected the formality and science of the Enlightenment for the emotional, subjective, and picturesque style of Romanticism.

Architecture of the Nineteenth Century: The Empire and “Beaux-Arts Eclecticism”

After the political chaos of the Reign of Terror at the end of the French Revolution, the emperor, Napoleon, insisted on a disciplined, cool, and elegant architecture heavily influenced by the archeological expeditions he supported. The resulting Empire Style was most evident in interior decorations and furnishings and in women’s fashions. It is nevertheless evident in such Parisian buildings as the **Arc de Triomphe**, the Bourse (stock exchange), the church of the **Madeleine**, and the shops and apartments along the rue de Rivoli.

Napoleon also began educational reforms in France, one result of which was the establishment of the *Ecole des Beaux-Arts* (School of Fine Arts) to replace the Royal Academies of Art and of Architecture, which had been abolished during the Revolution. Many schools of art and architecture in the West, especially in the United States, were patterned after the *Ecole des Beaux-Arts*, and generations of non-French architects, especially Americans, went there to study or to continue their education. A “Beaux-Arts” style, a florid mixture of details from various historical periods superimposed on a plan essentially derived from Roman principles, became the ideal for civic buildings in many parts of the world around the middle of the nineteenth century. Charles Garnier’s **Paris Opera (Palais Garnier)** is the most famous French example of the Beaux-Arts approach, and it also defines the Second Empire style, named for the regime of Emperor Napoleon II (1852–1870). Ironically, the most impressive collection and arrangement of buildings in the Beaux-Arts style was not in France but in the United States, the “White City” of the 1893 Chicago World’s Fair. It inspired the City Beautiful movement that changed the appearance of so many American cities. The *Ecole*, which was very conservative, lost its influence with the advent of the Modern. It was dissolved in the civil unrest of 1968, and the teaching of architecture is now decentralized and taught across France in a series of autonomous schools with extremely varied teaching philosophies.

A potent criticism of the *Ecole* was that it had failed adequately to take into account the new materials that the Industrial Revolution had provided for architects. This criticism was only partly justified. In fact, although France was not rich in either iron or coal, during the last half of the nineteenth century, French architects had been at the forefront of metallic construction. They created masterpieces of iron and, later, steel construction—**Les Halles**, the brilliant central markets of Paris (destroyed in the 1970s); the reading rooms of the **Bibliothèque Ste-Geneviève** and *Bibliothèque Nationale*; and, literally towering above all these, the most familiar symbol of Paris, the **Eiffel Tower**.

Another criticism of the *Ecole* was that medieval architecture was largely ignored, considered “incoherent” and barbaric. Viollet-le-Duc, one of the

great theoreticians of modern architecture, began his career, without attending the *Ecole*, by restoring medieval monuments of France in the nineteenth century, for example, **Notre Dame** in Paris and the church of the Madeleine in **Vézelay**, which were nearly ruins. He and his circle were pioneers in the historic preservation movement, although some of their efforts are not appreciated today because they “restored” rather than “preserved,” in the process replacing authentic details with imagined ones. **Saint Front** in Périgueux is a notorious example of overrestoration. Many of these same preservation architects also built new churches, for example, the shining white **Sacré Cœur** that dominates the hill of Montmartre in Paris, in a revived medieval style that ran counter to the dominant Beaux-Arts style.

Modern Architecture: Art Nouveau, Art Deco, and the International Style

Around the turn of the twentieth century, some architects reacted against reviving forms from the past. In Paris, the best-known examples of this reaction, now called Art Nouveau, are the stations designed by Hector Guimard for the new Paris subway, the **Metro**. Many of the French considered Art Nouveau to be mainly a decorative fashion and, worse, an imported one. They never liked Guimard’s Metro entrances, most of which have subsequently been destroyed. Art Nouveau was replaced by Art Deco, a style popularized by the 1925 Paris Exposition of Decorative Arts (from which the name derives). As a stylistic designation, the term Art Deco is broad and vague, but it is most frequently used to describe an approach to a simplified classicism influenced by turn-of-the-century Viennese design. Also influential in the creation of the Art Deco style was the work of the Perret brothers, who were influential in giving form to the relatively new material of reinforced concrete, the material that would dominate construction in twentieth-century France. They built the first apartment building to express its concrete frame, 25 bis, rue Franklin, and the **Théâtre des Champs-Élysées**, which is an even more structurally daring and seminal example of the Art Deco style.

A group of architects loosely associated with the Art Deco style declared that the “styles” were finished. They praised “machine-age” forms, especially the sleek shapes associated with automobiles, ocean liners, and, eventually, trains; and they rejected most decoration. Celebration of the machine and industrial processes and materials would, they thought, make their buildings modern, “timeless,” more “objective,” and not tied to a specific country or period, that is, styleless. These International Style buildings are characterized by austere simple, undecorated, geometric volumes; they are typically white and usually flat-roofed. The most famous International Style house is probably the **Villa Savoye**, designed by Le Corbusier, one of the two or three most famous and influential architects of the twentieth century. Period pho-

tographs of the house with automobiles of the time parked next to it—the Model A Ford was contemporary with the Villa Savoye—demonstrate how astonishingly advanced Le Corbusier’s house was. Nevertheless, although more recognizably “modern” than buildings preceding them, International Style buildings are not, in the end, as “styleless” as their architects had hoped. They can be dated as easily by most people as architecture from any other period, although a Postmodern revival of the style has somewhat confused the issue.

The Depression, World War II, and the economic problems that followed it effectively halted building in France, and few French architects built much of lasting significance from the 1930s to the 1980s. Nevertheless, several of Le Corbusier’s most important buildings were built during this period. **Ronchamp** (Notre-Dame-du-Haut) and the *L’Unité d’Habitation* (known as the Marseilles Block) are among the most important pieces of architecture of the twentieth century. Otherwise, the most significant buildings in France in the 1970s and 1980s tended to be designed by foreigners: the **Pompidou Center**, the Bastille Opera, and the **Louvre Pyramid**. French architecture by French architects revived, however, with the economy in the 1990s (e.g., the **Institut du Monde Arabe** and the vast new national library, the **Bibliothèque Nationale François Mitterrand**). In the twenty-first century, French architects—Jean Nouvel, Christian de Portzamparc, and Dominique Perrault, among others—are among the most famous and sought-after architects in the world.

Architecture of France

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ABBAYE AUX HOMMES (MEN'S ABBEY)/ST. ÉTIENNE, CAEN

Styles: Norman Romanesque (facade and nave), and Gothic (choir and apse)

Dates: 1066–1077, and Early Twelfth Century

Architects: Romanesque Architects: Unknown;
Gothic Architect: Guillemus

St. Étienne (St. Steven) is the church of the Abbaye aux Hommes (Men's Abbey) that William the Conqueror founded in 1066, the same year he conquered England. It was still unfinished when it was consecrated in 1077, in the presence of William and his queen, Matilda. St. Étienne is one of the masterpieces of Romanesque architecture in Normandy and the model for many other churches. It is of outstanding significance because it was one of the first churches to use stone ribs with cross-vaults to cover the interior. This was a key technical innovation in the development of Gothic architecture.

Exterior

Few Romanesque facades are more striking than St. Étienne's austere, H-shaped, rectangular cliff of stone topped with a pair of towers. It was the model for many French Gothic churches, including **Chartres Cathedral**. (St. Étienne's companion church at Caen, La Trinité, the church of the women's abbey founded by William's wife, Matilda, was a model for others, for example, **Notre Dame** in Paris.) Facades of most of these churches inspired by St. Étienne's are ornamented, but only the towers on St. Étienne's facade have any decoration, and that is minimal: There are no moldings or decorations around the doors, which are cut cleanly into the surface; there are no statues anywhere on the facade; and there is no rose window. Four thick, broad buttress walls that lie flat against the surface of the lower facade block and project upwards its entire height are the only things that break up the facade. They subdivide it into three *bays* with two rows of round-arched windows in each bay: three windows in each row of the central bay and one in each row of the side bays. The two square towers that sit on the lower facade like bot-

tles on a table are more richly divided, this time on three levels: Vertical channels are sunk behind the surface on the lowest; and there are tall, thin windows on the middle level and a pair of openings on the top. A group of spires was added to each tower in the early twelfth century. Four shorter, narrower spires that surround a tall, pointed central one look like miniatures of the tower. The lantern tower over the crossing, also typical of Norman architecture, was rebuilt at the beginning of the seventeenth century.

The First “Gothic” Vaulting

Up to its intersection with the *transepts*, the *nave* was completed during the Romanesque period and is almost as undecorated as the facade. St. Étienne's is proportionately wider than the naves of most Romanesque churches, for example, **Saint Sernin** in Toulouse, and that makes it seem especially spacious. It is also very regular, a succession of bays with round-headed arches on the ground floor; a deep tribune (gallery) at the second story that influenced **Notre Dame** in Paris; and a third, *clerestory* level, that was modified when the original flat wood roof of the nave was replaced around 1130 with stone vaulting.

Stone was a highly desirable replacement for wood in covering the interior of churches since wood ceilings and roofs, though less expensive and lighter, frequently burned with disastrous consequences (see **Chartres Cathedral**). Prior to St. Étienne, the usual way to use stone to cover a nave was to construct a *barrel* or *tunnel vault*. Because of its semicircular shape, this kind of vault presses both out and down on supporting walls, tending to both overturn and crush them. Walls are necessarily very thick and are occasionally thickened further to resist being tipped over. Openings, both in the supporting walls—and especially in the vaults—need to be minimal, thus interiors are relatively dark. Ancient Roman architects had avoided the problem by intersecting shorter cross-vaults with the longer barrel or tunnel vaults, resulting in an X-shape *groin vault*. The entire ends of the cross-vaults could be open. With the collapse of the Western Roman Empire, this technique had been lost for centuries and had only recently been relearned.

The architect of St. Étienne was one of the first to apply to the reintroduced groin vaults, a new idea that derived from several experiments by others. He made the groin vault more efficient by adding stone ribs along the ridges of the intersections that concentrated the forces exerted by the vaults onto supporting columns rather than the walls. Walls were unnecessary except to control weather, and since the vaults between the ribs span short distances, they could be made relatively thin, convex webs of stone. Since the whole structure is much lighter than either a barrel or groin vault, the supporting columns could be relatively thin. There was one disadvantage: Barrel vaults and thick walls could be constructed by relatively unskilled workers; the new system, called rib-and-panel vaulting, could be constructed only by highly trained, skilled masons.

Succeeding architects would refine the system in several ways, in particular by simplifying it. They would vault each bay with only four panels, the ribs forming an X (when looked at from underneath). St. Étienne's architect (and other architects of this period of experimentation) used six vaults to cover two bays: columns are connected directly across the nave and diagonally across two bays. Thus, three ribs converge on every other column, with only the transverse rib coming down on the intermediate columns. In a six-part system, columns alternate shape depending on whether they receive two or three ribs. Since St. Étienne was designed for a wood roof and only later adapted for stone vaulting, thin columns (*colonnettes*) were applied to the surface of the otherwise identical columns for those receiving three ribs. At the clerestory level, however, a small window in each bay had to be blocked wherever the three ribs came down, creating an unusual asymmetrical window arrangement. Otherwise, the architect, remarkably enough, was able to conserve the original nave elevation. Even before the vaulting was added, a new direction is evident in this interior. Compared to earlier Romanesque churches, vertical lines and vertical proportions are emphasized and contrasts of light and dark are more important, all accentuated by an increased use of sharp edges. Even without the new vault, St. Étienne begins to look Gothic.

The Choir

Influenced by the choir of **Saint Denis**, the first true Gothic construction, St. Étienne's *choir* (the east end of the church) was rebuilt about 1200. (St. Denis's facade was, on the other hand, one of those influenced by St. Étienne's.) The *apse* of the choir was surrounded by a walkway (*ambulatory*) from which chapels radiated and opened onto each other. This first Gothic choir in Normandy was much imitated. Its construction permitted much more light into the church than the old Romanesque apse and it seemed much more open, much more expansive. Guillemus, the architect, introduced new decorative details, in particular chevrons and *crockets* (decorative leaves that curve upwards), and he pierced holes in parts of the walls above arches in the apse to visually lighten these surfaces. They give the impression of being able to see into the walls. He skillfully integrated these innovations with the Romanesque nave, so that St. Étienne has a sense of homogeneity lacking in other Romanesque churches partially rebuilt in the Gothic style (see **Vézelay** or **Mont Saint Michel**, for example). Curiously, he added rose windows to the outside walls of the tribune around the apse, a detail no one copied.

St. Étienne During Three Wars

St. Étienne and the abbey were ruined in the sixteenth century during the Wars of Religion, at which time William the Conqueror's tomb in the choir was desecrated. His remains were scattered to the winds during the French Revolution. The church and abbey were restored at the beginning of the seventeenth century, and William's tomb was reconstructed without its inhabitant. In the nineteenth century, after the French Revolution, St. Étienne

became a parish church and the Abbaye aux Hommes turned into a high school; it is now the city hall. Fortunately, both abbey and church were spared when most of the city was destroyed by bombing during the Battle of Caen at the end of the Second World War.

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AIGUES-MORTES, AIGUES-MORTES, MEDITERRANEAN COAST

Style: Gothic

Dates: 1440–1489, with minor subsequent modifications

Architect: Unknown

Aigues-Mortes, a fortress-city on the Mediterranean coast between Marseilles and Montpellier, was built to serve three purposes: (1) it represented the king's presence in southern France, which had only recently been effectively made part of the realm with the subduing of the Cathars and the expulsion of the English; (2) it was the port from which Louis IX (St. Louis) launched two crusades, in 1248 and again in 1270; and (3) it was a royal port for importing stuffs from the Orient and exporting products to Italy. With Aigues-Mortes, Louis IX became the first Capetian (the dynasty that ruled France from 987 to 1328) king to have a port on the Mediterranean.

Aigues-Mortes's most significant features are its outer fortress walls, declared a national historic monument in 1903. *Battlements* and defensive towers, which are intact around the entire city, are among the least restored, thus the most authentic, in France. Within the walls, only the fortress tower at the northwest corner (the castle) and a few buildings along the main street leading to and around the central square of the city are of architectural sig-

nificance. Churches within the city walls suffered much during the Wars of Religion and the decades when the city was largely abandoned. Other city buildings are frankly utilitarian.

Choice of the Site

Louis founded his new city in 1240 on a marshy littoral plain, on land owned by the abbey of Psalmodi. It was named Aigues-Mortes after an existing port at that location called Eaux-Mortes (literally “dead water”—a reference to the salt lagoons in the region); “Aigues” is the local dialectal equivalent for “Eaux.” Southeast of **Nîmes** and at the mouth of one of the branches of the Rhone River, Aigues-Mortes lay strategically between Provence to the east, which was part of the Holy Roman Empire, and Aquitaine, formerly ruled by the English, and Languedoc in the west. Aigues-Mortes, with the royal fortress of **Carcassonne**, was intended to neutralize the counts of Toulouse.

Chronology of the Construction

First to be built, between 1242–1249, was the tall, round *donjon*, the “Great Tower of the King” (now called the Tower of Constance), which served as a fortress, a lighthouse (fires were lit atop it to guide local sailors), and as a symbol of the king. Louis had the city built on adjoining land that he purchased from Psalmodi abbey in 1248. Carcassonne is planned like the *bastides*, fortress towns that the crown built across southern France in disputed areas, and, as with the bastides, extraordinary rights were extended to citizens to attract them. Five streets in both directions cross at right angles but are laid out in an irregular grid. A magistrate’s house (now the city hall) and the parish church, Notre-Dame-des-Sablons, were built on the Place St. Louis, the main town square. A barracks for the soldiers and a governor’s palace were built on a second open space, the Place d’Armes, just inside the main entry. Until relatively recently, the eastern third of the city was uninhabited, left open for gardens and probably the cemetery. Thus, the Place St. Louis was not in the center of the area defined by the rectangle of the walls, but considerably to the west of center.

Building canals and a road to connect Aigues-Mortes to Nîmes and Montpellier took precedence over the city walls, which had scarcely been begun when Louis left on the Eighth Crusade in 1470. They were still very incomplete in 1486, when the coast was attacked and Aigues-Mortes’s vulnerability revealed. The walls were finished in about three more years. A need to improve the port had also delayed construction of the walls. Supplies and merchandise had to be ferried to the city by barges from a protected lagoon that accepted deep-draft ships. Even the crusaders’ ships had left from this lagoon, not from the city.

The 1486 attacks emphasized the problem. A channel was dug through the littoral to the sea and a stone jetty built at the city, making Aigues-Mortes

the port city for Nîmes. Bit by bit, the crown acquired land near the town to make it self-sufficient, including the salt flats that are still used for salt production.

Aigues-Mortes flourished for a while, but it soon declined. It had been built too close to the mouth of the “Little Rhone,” which rapidly silted up the harbor. Continuous dredging proved too expensive, and when Marseilles was incorporated into the kingdom, its bigger, better port ended Aigues-Mortes’s use as a port city. During the Wars of Religion, the Tower of Constance became the largest Protestant prison in the realm. Finally, in the nineteenth century, salt production was increased, vineyards planted, and tourism developed. By 1990, about 5,000 people lived in Aigues-Mortes, many of them outside the walls.

The Walls of Aigues-Mortes

In their final form, the walls of Aigues-Mortes enclose about 40 acres in an irregular rectangle, roughly a half by a quarter of a mile, with its corners oriented to the cardinal points, as was characteristic of Medieval French fortresses. (For comparison, **Avignon**’s walls, the longest in Medieval Europe, begun in 1355, are about three times as long at 16,404 feet.) The northeast and southeast sides of Aigues-Mortes (1706 and 1066 feet, respectively) are longer than the southwest (sea) and northwest sides (1673 and 935 feet, respectively). Fifteen gateway towers—five large and five small—are built into the wall at regular intervals. There were only two entries on the northeast side, which because it faced landward was more vulnerable than the southeast side, which had five. Two protecting towers flank the entries on the northeast, and the Tower of Constance, which was outside of the walls and surrounded by a moat, is complemented by towers at each of the other three corners. Between them, the curtain walls are 25 to 36 feet high and more than 8 feet thick. A 15- to 30-foot-wide esplanade at the base of the walls on the inside permitted troops to move around the perimeter of the city.

All of the gateways straddle the wall. Pairs of semicircular towers frame the larger gateways on the exterior, but the towers are rectangular on the city side. Most towers have two or more floors, though sockets indicate that wood beams once supported intermediate floors in some of the larger rooms. They and the wood beams that once supported walkways projecting above the walls have also disappeared, but otherwise, unlike the walls at Carcassonne, which were heavily restored under the direction of Viollet-le-Duc, Aigues-Mortes’s walls have been only lightly restored and adapted to modern conditions (such as the change from bow and arrow to guns). Smaller gateways are mostly rectangular on both sides, some with decorative polygonal corner towers on their second stories. All the gateways have external and internal arrow slots (*archères* or *meurtrières* in French) and openings in the ceiling (*assommoirs*) for shooting at or dropping projectiles on attackers. A portcullis (*herse*), a reinforced grille, could be lowered to close all gate-

ways. (For more on Medieval castles, see the entries for **Mont Saint Michel** and **Pierrefonds**.)

The army casern or barracks, built between 1746 and 1750, replaces an older one and is now a hotel-restaurant. The Hotel of the Governors, a large rectangular building arranged around a courtyard, has been remodeled many times and was restored in 1986. Architecturally, its most interesting feature is the rectangular staircase added between 1660 and 1670.

Unquestionably, the most striking single feature at Aigues-Mortes is the Tower of Constance, a stone cylinder nearly 100 feet high and 72 feet in diameter. A smaller stone cylinder, the extension of a spiral staircase inside the tower, is topped by an iron cage (the lighthouse) that has a conical stone cap. There are two large, vaulted floors above ground in the tower and a small basement room in the foundations accessible only by a circular opening in the ceiling. Used for storage and, when necessary, as a prison, this is what most English speakers think of as a “dungeon.” Whereas the defensive walls are constructed of rough-faced (rusticated) blocks of stone, the tower walls are built of smooth blocks with neither projections nor masons’ marks. The tower was probably not a residence, but no traces of any other have been found. There must also have been connections between the Tower of Constance and the city, but neither written records nor visual traces of them exist. The present bridge from the governor’s palace to the tower is relatively recent.

The walls of the tower are built on wooden pilings driven deep into the marshy ground and are thick enough—20 feet—to accommodate stairs, small rooms, chimneys, wells, and, today, an elevator. The very few openings through the walls are narrow on the exterior but broad on the inside. Defenders could shoot out from them, but it would have been difficult for an attacker to fire an arrow through them. All masonry is of a very high quality; most of the stone is from quarries near the town of Aubais, about 15 miles from Aigues-Mortes.

Decorations are relatively few and limited primarily to *keystones* of vaults, *corbels* supporting arches, *gargoyles*, and *capitals* on the few columns or *colonnettes* in interior rooms. They appear to have been carved with no overall scheme or program in mind; rather, decorations seem to have been the mason-artists’ individual creations. Most are abstract (leaves, a few flowers, some decorative patterns), but some figures are involved, often satirical. Medieval sculptors obviously had a sense of humor.

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ANCY-LE-FRANC: CHATEAU, ANCY-LE-FRANC, BURGUNDY

Style: French Renaissance

Dates: 1545–1578

Architect: Sebastiano Serlio (1475–1554)

Ancy-le-Franc may well be the only pure example of classic, Italian Renaissance architecture in France. Its purity of style is, in any case, nearly unique for sixteenth-century France, and it is certainly the only Renaissance chateau attributed in its entirety to an Italian architect. The chateau and books written by its architect, Sebastiano Serlio, were enormously influential in French architecture; they confirmed, in a second wave, the transforming influence of Italian architecture on French architects. There was a first wave in the early 1500s, when French kings, most notably King François (Francis) I, imported Italian painters, sculptors, and architects—Leonardo da Vinci being the most famous—to introduce the Renaissance style into France. They designed such buildings as the Loire Valley chateaux (manor houses) at Blois, **Chambord**, **Chenonceaux**, and Azay-le-Rideau; princely residences that combined aspects of the Medieval castle with the new ideas for a stately residence. Serlio's architecture was more radical; it left behind the most obvious holdovers from the Middle Ages in creating a new, residential architecture devoted almost entirely to comfort and splendor.

The Patron

Construction on Ancy-le-Franc was begun in 1546 for Antoine III de Clermont, governor of the Dauphiné, the region of eastern France just north of Provence, and Grand Master of Water and Forests, on property he had inherited after his mother's death in 1537. He had married the sister of Diane de Poitiers, mistress of King Henri II and owner of Chenonceaux; thus he was immensely rich, powerful, and familiar with the most advanced architectural thinking of the time. He said he wanted a manor *al costume italiano*—in the Italian manner—hence his choice of Serlio as architect.

The Architect

François I had brought Sebastiano Serlio, an architect originally from Bologna, to his court in 1540–1541 to advise him on the construction of **Fontainebleau** and the **Louvre**. Serlio's fame in Italy was based mostly on his book, *L'Architettura*, which he projected as a series of eight volumes. Only



Ancy-le-Franc (1545–1578) is the purist example of Italian Renaissance influence in France and the only French building designed entirely by the Italian architect Sebastiano Serlio.

five were actually published in his lifetime, the last in 1551. The initial volume appeared in 1537, almost entirely devoted to the practice rather than the theory of architecture. In it, alongside ancient buildings, he illustrated plans, elevations, and details of what were then modern buildings by Bramante, Peruzzi, and Sansovino. This and the other four of the *Five Books on Architecture* became a basic reference throughout Europe, but especially in France, for the “correct Italian manner,” that is, the Renaissance style. Though not a great architect, Serlio was a genius at adapting his designs to local conditions; that is, his designs became increasingly French the longer he stayed in France. He served mostly in an advisory role, but two of his independent designs were built, a house for the cardinal of Ferrara in Fontainebleau and Ancy-le-Franc. Only the latter survives.

An Italian Design with a French Accent

Serlio’s first designs for Ancy-le-Franc look very different from what was built, rather like an Italian castle from the area west of Venice or, even more, like Poggioreale, a castle designed by Giuliano da Maiano and built in 1487 near Naples that Serlio had illustrated in volume III of his *Five Books*. As built, Ancy-le-Franc is much more refined and delicate than Serlio’s original proposal, which had a base of stones left rough-hewn as in a fortress. It appears that his client objected and wanted *pilasters* (flat, attached columns) on all floors of his building, a feature found at François I’s Chambord. As a result, in the courtyard, the rhythmic, delicate facades are remarkably similar

to those of Bramante's Cortile di Belvedere (now part of the Vatican museums) and Serlio's own proposal for the Louvre.

Unlike the earlier Italian-influenced manors in the Loire Valley, Ancy-le-Franc has few traces of feudal military architecture. Its moat, around all four sides, is obviously decorative, too small to be effective in a battle with guns. Loopholes in the corner towers would have (symbolically) provided for musket cross-fire to protect the entrances, and there were originally few windows on the exterior of the ground floor. By 1578 when Antoine died, however, even these symbolic gestures were no longer considered appropriate, and his grandson, Charles-Henry, who inherited the chateau, had numerous windows added to make the ground floor rooms more pleasant. Charles-Henry also had three of the four entry doors—there is one in the middle of each side—enlarged and decorative frames added. Because Serlio's facades are based on a regular module, these changes could be made without their appearing to be an afterthought.

A Facade of Sober Elegance

Except for three arched openings in the middle of the upper story on one side, Ancy-le-Franc's four exterior facades are nearly identical. Between the projecting three-story towers at the end of each facade, mathematically regular grids formed by pilasters and the strong horizontal lines of the continuous base, *entablatures*, and *cornices* order the facades. This grid, formed by representations of structure, more than any other aspect of the design, makes Ancy-le-Franc French. Though not this uniform, a structural grid had been traditional even in the Middle Ages. It was codified into the ordering system, which the French call *ordonnance*, by Claude Perrault, influenced by René Descartes, in the seventeenth century to form the basis of French classicism. (See **Louvre and Tuileris Garden**.)

Architectural details show much less fantasy and are more archeologically correct at Ancy than at the earlier Loire Valley Renaissance chateaux, reflecting Serlio's architectural training in Italy and his scholarly writing. The doorways in the center of each side seem to break the principle of regularity, but they reflect changes by Charles-Henry. Only the south door is original and worthy of a fortress: small, squat, and built of iron. The north door, which is flanked by a pair of columns supporting a balcony, is the most ornamented. It closely resembles contemporary Italian practice. Above it is the Clermont motto: "Soli deo Gloria" (Glory to God alone). Windows are centered in almost every bay, except on the corner towers where the outer bays are blank. Because Serlio adapted his architecture to local conditions, the chateau shows remarkably little effect from weathering. He considered the severity of the weather in this region of France when he selected stone of high quality and created an especially solid construction.

The Courtyard

The inner courtyard is reached from the entry by a flight of nine steps, at the top of which is a gallery that extends across the width of the courtyard. It opens onto the courtyard only through three centered, arched openings. Court facades are more refined than those on the exterior, but, like them, are nearly identical except for the entries in the center of the ground floor. There are three arched openings in the north (main entry) and south facades, but a single doorway in the east and west facades. Stairways to the upper floors are at each end of the galleries, that is, in the four corners of the courtyard. The more decorative *Corinthian Order* is used on both stories for pilasters rather than the more austere *Doric Order* found on the exterior. Pilasters are paired and set up on a pedestal. On the upper floor there is a roundheaded niche between the pairs of pilasters; in the corresponding location on the lower floor, there are dark gray panels, a square above a roundheaded rectangle. Between each of these units is a window.

Interior

Ancy-le-Franc's interior is the most sumptuous in Burgundy, with murals executed during several periods. Some of the most famous artists of the sixteenth century worked at Ancy, for example, Primaticcio, Nicolo dell'Abbate, and their students, who were brought from Italy to decorate Chambord and Fontainebleau. Decorations, especially the paintings with mythological figures, are thus very typical of Italian Mannerism.

The Chateau Today

Except for some of the decoration, Antoine III de Clermont enjoyed a finished chateau when he died in 1578, but otherwise the end of his life was sad. Both of his sons were killed in wars. His grandson, who inherited the chateau, continued with Antoine's patronage of great artists and made modifications that improved the manor. For six generations, the Clermonts owned Ancy-le-Franc. Louvois, one of Louis XIV's ministers, bought it in 1683, and his family held on to it until 1844, when the Clermonts bought it back. They sold it in 1980, when the furniture, which had remained with the chateau since the beginning, was auctioned. It suffered quasi-abandon until an American, Stephen Roy, purchased it in 1999 and began a restoration. Ancy is now owned by Paris Investir, which continues the restoration.

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ANET: CHATEAU, ANET, WEST OF PARIS NEAR DREUX

Style: Renaissance

Dates: 1547–1552

Architect: Philibert Delorme (also spelled de L'Orme or de l'Orme)
(1500 or 1515–1570)

Three buildings establish and define the character of French Renaissance architecture: the part of the **Louvre** in Paris designed by Lescot; the chateau (manor) of **Ancy-le-Franc**, designed by Sebastiano Serlio; and the chateau of Anet, designed by Philibert Delorme. Taken together, they show how much Italian architecture changed the direction of architectural practice in France and in what way. Ancy-le-Franc was designed by an Italian who adapted his work to local conditions. The other two architects were French. Lescot used Italian Renaissance motifs in a somewhat unorthodox manner; he had seen them only in engravings, and, not being trained as an architect, perhaps he did not quite understand them. Philibert Delorme, on the other hand, had studied in Italy from 1530 to 1533. Anet, the chateau he designed for King Henri II's mistress, Diane de Poitiers, shows that he thoroughly understood what he had seen—and also that he had mastered the structural proficiency that was characteristically French. A brilliant architect, Delorme was put in charge of all royal buildings except the Louvre by Henri almost immediately after his coronation in 1547.

Chronology

Henri showered money and possessions on Diane—he also gave her the Loire Valley chateau of **Chenonceaux**—and her manor at Anet was so extravagantly built that it can almost be considered a royal chateau. No records establish precisely when Philibert Delorme began to work on it. His name first appears on documents in 1547, the year Diane's contested rights to the property were confirmed. Construction probably began that year, and though



Philibert Delorme (or de l'Orme) designed the chateau of Anet (1500 or 1515–1570) for King Henri II's mistress Diane de Poitiers; he was the most imaginative French architect designer of the Italian Renaissance style.

decoration of the interior continued for several years, the chateau was most likely structurally complete by 1552, when the court was paved. (The supposition that the chateau was nearly finished when François I died and Henri II became king is almost certainly wrong.)

General Layout of the Manor and Its Outbuildings

Some of the confusion about early construction was caused by Diane's desire to keep at least part of the Medieval castle that she had inherited from her husband, Louis de Brézé, who died in 1531. Early accounts to workmen were probably for repairs to it. In the end, Delorme kept almost none of the castle, though as in so many other aristocratic manors in this period of transition between fortress-manor (*chateau fort*, in French) to Renaissance pleasure palace, he kept several features derived from military architecture. Anet was surrounded by a wall with two (symbolically) fortified gates and a water-filled moat. Foundations for the four outer corners of the outer wall were lozenge-shaped bastions, forms derived from contemporary military fortresses. Two rectangular terraces to either side of the main entry gatehouse were created for cannons, an innovation in military architecture widely used at the time. Five cannons arrived at Anet in 1552. At Anet, as at Azay-le-Rideau or

Chenonceaux, however, these military features are largely decorative and symbolic of the aristocratic background of the owner.

Within the outer wall, the chateau and its outbuildings were arranged around three courtyards in front of a large garden. Formal entry to the estate was through a gatehouse into a forecourt formed by the U-shaped residence. Its main wing, the *corps de logis* (literally, the “body of the dwelling”), was the rectangular block at the back of the U. Except for the central part of the facade, which is now in the Ecole des Beaux-Arts in Paris, nothing remains of it. Though heavily restored, the block to the left, which contained a suite of secondary rooms, still exists and is lived in by the present owners of the chateau. When the slightly lower wing across the court was demolished, the palace chapel, a masterpiece of masonry construction that was built into it, was spared and now sits isolated. A second set of courtyards lay on the far sides of the secondary wings. There were fountains and sculptures in them and in the garden at the back of the *corps de logis*. The most famous of these, a statue of the goddess Diana and a deer, is now in the Louvre. The far side of the left courtyard was closed off by an open-air handball court, a part of every manor of quality in the period. On the far side of the right-hand courtyard was a secondary entry to the chateau and the remains of the old Medieval castle. All but the secondary entry, the so-called “Gate of Charles the Evil,” were demolished after the Revolution, and only traces remain.

Architectural Details: The Entry Gatehouse

While one regrets that parts of the chateau were demolished for their building stone, the three existing parts are of extraordinary interest and importance. In designing the entry gatehouse, Delorme was inspired by some of the buildings he had seen during his stay in Italy. It is unique, an original composition with no direct precedent and no successors. Delorme conceived it as a pyramidal stack of blocks: the lowest level is an arch, containing the main, rectangular doorway, flanked by two smaller arched doorways framed by *Doric* columns and their *entablatures*. (Only the central doorway was functional; the other two openings are decorative.) This combination of openings and columns creates the effect of a Roman triumphal arch like that at **Orange**, but it can also be interpreted as a Palladian motif, an architectural figure popular in the sixteenth century. Such multiple interpretations of architectural features indicate that at the very least Delorme was familiar with what was then fashionable in Italy. The semicircular area above the lintel of the door is filled with a relief (now replaced with a copy) by the famous Italian sculptor Benvenuto Cellini showing a deer in the company of a nymph, a deer being a symbol associated with Diana, goddess of the hunt. Another sculpture of deer, this time with two hounds, surmounts the gateway just above a clock; the deer sounded the hour by tapping its hooves, the hounds by baying. (All these sculptures have been replaced by immobile copies.) Another clock on the interior of the gatehouse showed the zodiac, the phases of the moon, and the positions of the stars and planets. A final bit of deco-

ration seems a curious step backward for Delorme. Instead of balustrades on top of the four lower blocks of the gatehouse, Delorme substituted stone railings with a complex interlaced design. He was proud of them, but they resemble details from Late Gothic (Flamboyant) architecture of at least fifty years earlier.

Corps de Logis

The main residential wing of the chateau had probably already been built when Delorme was brought in. He most likely added only the *frontispiece*, the ornamental center bay. It is, however, very important for the history of French architecture. It was the first example in France of the syntax and vocabulary of classical architecture used in accordance with the canons of the Renaissance masters. *Doric*, *Ionic*, and *Corinthian Orders* are superimposed in what was accepted to be the correct order, as they are used on the Colosseum in Rome, for example. The frontispiece at Anet was considered so important a model for French architects that after the Revolution, when the chateau began to be demolished, it was dismantled and remounted in Paris, where it still stands in the courtyard of the École des Beaux-Arts, the Parisian school of art and architecture.

The Chapel

The chapel at Anet was almost certainly the first in France since antiquity to use the circular plan so beloved by Italian Renaissance architects; for them, the circle was a symbol of God's perfection. Its dome is a masterpiece of stone construction, a testament to Delorme's great ability as a mason. He, in effect, projected onto the spherical surface of the dome the mosaic pattern in the floor, made up of arcs of circles intersecting to create the illusion of spiraling in to the center of the circle. Delorme translated the arcs into the ribs that define quadrilateral panels inset into the dome's surface. They get smaller and more distorted as they approach the *lantern* (a construction that lets light into the top of the dome), creating an illusion of a spiral toward the light. Shaping the blocks of stone that create this dome—they are all shaped and cut differently and do not correspond to the pattern—required specialized knowledge, the “masonic secrets” that the initiated architect or stonemason had to know. Looking up into the dome, one is mesmerized both by the illusion created by the pattern and by the extraordinary skill required to design and to construct it, which was Delorme's intention.

The floor pattern is another example of Delorme's transforming what he had seen as a student in Italy. It resembles some ancient Roman floor mosaics, but it also recalls Michelangelo's design for the Capitoline Hill paving. The shape and relation of the side chapels to the main space also shows a similarity to Michelangelo's work, and the illusionism in the dome recalls the perspective illusionism in Michelangelo's Medici tombs in Florence. Like all great artists, Delorme transformed several influences into something quite new and, in this case, quite French.

Anet after the Revolution

Although the chateau was remodeled somewhat at the end of the eighteenth century, it remained essentially intact until 1794, immediately after the end of the Revolution, when the furnishings were dispersed. A large part of the chateau was demolished in the years from 1804 to 1811, Alexandre Lenoir saving the frontispiece of the corps de logis and taking it to Paris. When the right wing was demolished, the chapel, which had been built into it, was left without a facade; that was added in 1840 by Augustin-Nicolas Caristie.

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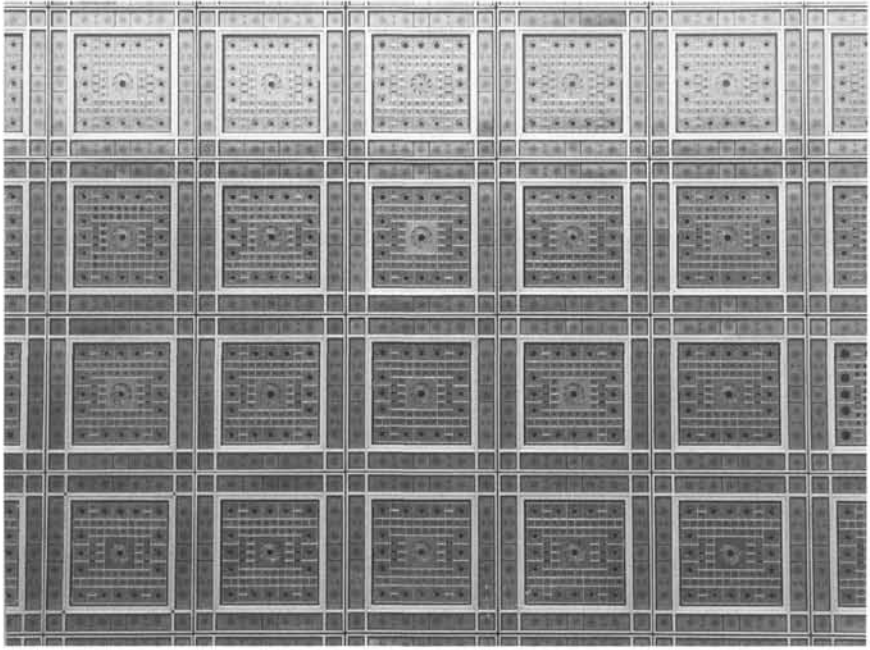
ARAB WORLD INSTITUTE, PARIS

Style: Modern

Date: Opened to public in 1987

Architects: Jean Nouvel (1945–) with Pierre Soria,
Gilbert Lézénès, and Architecture Studio

The Arab World Institute (Institut du Monde Arabe) is a cultural center created by a partnership between France and twenty-two Arab countries to familiarize the French more fully with the Arab world; with its language, its civilization, and its art. The institute one was of the *Grands Projets*, a group of large buildings including the **Grand Louvre**, the Bastille Opera, the national library (the **Bibliothèque François Mitterrand**), the **Grande Arche**, and the Orsay Museum, which were constructed in the 1980s during the presidency of François Mitterrand. While most of these were designed to stand out from the buildings around them, the Arab Institute was designed to fit discreetly into its neighborhood, part of the Latin Quarter. Here, most buildings are constructed chiefly of stone or plaster and have traditional moldings and cornices, traditional windows cut into thick walls, and slate or lead roofs. The institute is built entirely of metal and glass, its walls *are* windows, and it has a flat roof. There is no ornamentation or decoration in the traditional sense, though the south facade, about 250 feet long, is a modern interpretation by the architect, Jean Nouvel, of sun-shading devices arranged



This detail of the entry facade of the Arab World Institute (Institut du Monde Arabe, Paris, finished 1987) shows the architects' use of modern materials and technology to interpret traditional Arab designs.

in traditional Islamic decorative patterns. The Arab Institute is a brilliant synthesis of Arab and Western culture.

The Institute's Site and Symbolism

The Arab Institute was built on the south side of the river Seine (the Left Bank) across from the Ile St. Louis, several hundred yards east of **Notre Dame** Cathedral. It occupies a curved corner site where a street running south toward the **Panthéon** intersects with the busy street that runs along the Seine, the Quai Saint Bernard. Jean Nouvel designed the institute as two blocks separated for most of their length by a long slot that leads to a square courtyard. He curved the block toward the Quai to match the curve in the street and made it a bit lower than the rear block. By maintaining a height similar to that of the other buildings in the quarter, and by softening and reducing the scale of the all-glass wall with a multitude of horizontal, metal fins that spread like a grid of mechanical lace over it, Nouvel designed this north facade to allude to the scale and fine detail of the old city. Ceremonial entry to the center is through the slot between this north block and the rear south block of the building, but normal entry is by way of the plaza on the building's south side.

This facade, which extends across the entire side of the large entry plaza, is composed of 240 square panels arranged in a grid above a strip of clear glass. At the center of this strip are the entry doors, also clear glass. Each panel in the grid is made up of diaphragms that resemble the shutter mechanism of a camera. Small and large diaphragms are arrayed in a grid within each panel: one large diaphragm in the center, surrounded by sixteen medium-sized and fifty-five small diaphragms. All are linked together and controlled by a photo-voltaic cell that closes or opens them, depending on the intensity of sunlight on that part of the facade. Especially on days when clouds cast moving shadows across the facade, visitors are fascinated with the opening and closing of the diaphragms, though somewhat surprised that they open and close in broad groups of panels rather than one by one. Unfortunately, this very “high-tech” facade needs constant maintenance, and the panels frequently break down.

Although each panel looks very modern and representative of advanced technology, the effect of the panels repeated across the whole facade is that of a traditional Arab design, such as one sees in the tiles of the Alhambra in Spain. By referring in this abstract way to Arab traditions, Nouvel meant the south facade, like north, to suggest a connection to history. The connection is not merely decorative; the panels are also a modern interpretation of *mashrabieh*, the elaborately patterned screens used to shield the upper floors in Arab houses. This subtle, refined, and beautiful facade contrasts with the horrendous, prisonlike Faculty of Sciences building of the University of Paris, which dominates the other side of the entry plaza. Nouvel’s institute quietly and effectively criticizes it as inhumane and simplistic.

The Interior

Immediately inside the entry doors, visitors cross a dramatic, open, vertical shaft containing stairs and the glass-enclosed elevators. To the left and right are reception areas incorporating a bookstore and views down into the temporary exhibition gallery. To fit all the facilities needed in the limited building height and keep the plaza as large as possible, ceiling heights of the floors are very low, thus the need for the temporary galleries to be double-height spaces that, like the 300-seat auditorium, are entered from the basement level. The floors above ground level—there are nine floors in the building—contain meeting rooms, study areas, a museum of Islamic civilization and art, a research library, a restaurant, and a terrace with a spectacular view of the *apse* of Notre Dame. On the east end of the southern block is a sculptural spiral stairway enclosed in a volume square in plan.

An elegant, humane Modern building, assembled like a fine watch (or camera), the Arab Institute contains references to past architecture that make it in some respects an appealing example of Postmodern architecture, too. A few years later, Jean Nouvel created another fine example of Modern/Post-

modern architecture that fits well into historical Paris: the headquarters and museum of the Cartier Foundation.

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ARC DE TRIOMPHE (ARCH OF TRIUMPH), PARIS

Style: Neoclassical

Dates: 1806–1836

Architects: Jean-François Chalgrin (1739–1811), and others

Only the **Eiffel Tower** and perhaps **Notre Dame** cathedral are more readily recognized symbols of Paris than the Arc de Triomphe, frequently visible in the background of pictures. Originally planned to glorify the emperor, Napoleon, it is now dedicated to the memory of all French soldiers, including the Unknown French Soldier, whose tomb is directly beneath the center of the arch. The Arc de Triomphe sits in the middle of a large, circular plaza at the opposite end of the Champs-Élysées, Paris's most monumental avenue, from the **Place de la Concorde**. Still popularly called the Place de l'Étoile (Place of the Star) because of the twelve-pointed star in the paving from which twelve streets radiate, the plaza has been officially renamed the Place Charles de Gaulle for the famous French World War II general and president of France.

The scale of the Arc de Triomphe is deceptive. A half hour's walk toward it from the Place de la Concorde scarcely seems to bring one much closer. This illusion results from the arch's elegant simplicity. Its mass is not broken down by the multitude of moldings, openings, or decorations that allow one to understand the size of most buildings; everything about it is big. It is about the height of a typical fifteen-story building (162 feet from the ground to the top of the guard railing) and almost exactly as wide as it is tall. The arched opening in the center is itself almost ten stories (100 feet) high. Its size and its monumental simplicity give it a grandeur, however, appropriate for the immensely wide Champs-Élysées Avenue.



Although designed to celebrate Napoleon's victories, the Arc de Triomphe (Arch of Triumph), Paris (1806–1836), was delayed for decades by his defeat at Waterloo.

History of the Site

André Le Nôtre (1613–1700), the French landscape genius (he designed the gardens of **Vaux-le-Vicomte** and **Versailles** among many others), laid out the Avenue des Champs-Élysées in 1667. He conceived the avenue as the western extension of the central axis of the Tuileries Gardens west of the **Louvre**, and designed it to disappear over the top of the Chaillot hill. At the time, the Champs-Élysées was entirely in the countryside, and it still was when, a century later, Ange-Jacques Gabriel, architect of the Place de la Concorde, extended the axis to the village of Courbevoie. Between 1768 and 1774, Jean-Rodolphe Perronet, the engineer for the **Panthéon**, graded the top of the Chaillot hill into a flat, round area on which he and Gabriel imagined a large, white marble obelisk not unlike the Washington Monument. Others proposed more fantastic monuments, for example, a gigantic elephant with a statue of King Louis XV on top. Nothing was constructed until Claude-Nicolas Ledoux (1736–1806), the designer of the **Royal Saltworks** at Arc-et-Senans, built a pair of toll booths on the hill, part of a wall built around Paris to collect taxes. In 1798, after the French Revolution, there was competition for a monument, but nothing was built.

Napoleon's Arch

After he was made emperor, Napoleon proposed several monuments to beautify Paris, among them a column “dedicated to the glory of the Grande Armée” and a triumphal arch for the site of the Bastille fortress, whose destruction marked the beginning of the French Revolution. The column was built, but Jean-François-Thérèse Chalgrin (1739–1811), whom Napoleon commissioned to study the arch, considered the site too irregular for it and the ceremonial avenue impractical for which it was to serve as a monumental entry. (The avenue was to lead from the east edge of Paris directly to the Louvre.) Instead, Chalgrin proposed erecting the arch on the Chaillot hill. Napoleon agreed. For him, a triumphal arch recalled Imperial Rome and the great King Louis XIV, who had replaced fortified gates in the wall around Paris with triumphal arches, one of which, the Porte St. Denis, built in 1672 by François Blondel, was considered one of the most admired monuments in Paris. Napoleon commissioned Chalgrin and Jean-Arnaud Raymond to design the new arch, whose cornerstone was laid on August 15, 1806, the emperor’s birthday. Chalgrin’s specific model was not Blondel’s; it was Imperial Roman, the Arch of Titus in Rome, but that would change.

Almost all triumphal arches are variations of the same basic idea: two large, rectangular piers joined at the top by a semicircular arch and surmounted by a crossbeam (called an attic) roughly as deep as the piers are wide. This pier-and-arch shape may be plain or ornamented and enriched by decorative columns, elaborate cornices, and sculptures glorifying persons or events (see the entry for the triumphal arch at **Orange**). Panels representing Titus’s conquests at the head of the Roman army decorate his arch; sculptures commemorating Napoleon’s triumphs were to decorate the Paris arch.

Since Napoleon’s arch had to impress from as far away as the Louvre, a mile and a half away, it had to be considerably larger than its model. The sides of such a large triumphal arch could not be solid, as in the model, and were therefore designed to be pierced by smaller arches flanked by more columns. From the beginning, but especially after construction began, distinguished architects of the period criticized Chalgrin’s design. Foundations had advanced so rapidly, however, that few major changes in the size of the arch could be made. Chalgrin did, however, respond to some of the criticisms by simplifying and refining the ornament, eliminating columns from all four sides of the arch, and dramatically reducing the amount of sculpture. As a result, his design gradually came to resemble Blondel’s arch more than the Arch of Titus.

The revised design was built full size in wood and canvas for Napoleon’s marriage to Marie-Louise of Austria in 1810. This “model” permitted the architect to refine his design further, but he died the next year and was replaced by a former pupil. In 1814, Napoleon was defeated, France invaded, and construction on the arch, which had reached the springing of the central arch, was halted.

The Arch Redesigned

By 1818, monuments like the Arc de Triomphe had become unfashionable, and some architects even proposed demolishing the unfinished arch and recarving the existing blocks of stone into a fountain or reusing them in a “temple to the illustrious men of France.” No work was done until the monarchy had been restored in 1823, and King Louis XVIII ordered the Arc de Triomphe to be finished immediately. It was to be rededicated to the bravery of the Army of the Pyrenees, which had been led by his nephew. Jean-Nicolas Huyot was commissioned to revise Chalgrin’s design, which was again criticized. His schemes were considered impractical, and in 1825, King Charles X ordered Chalgrin’s plans to be respected with minor modifications: A crowning sculpture of a quadriga, a chariot drawn by four horses, representing France triumphant, was to be installed on the top. This, too, was not carried out.

Guillaume-Abel Blouet became, in 1832, the architect who finally completed the project, now rededicated to the armies of the Revolution and the Empire. He mostly carried out Chalgrin’s last design, adding some ornament, most of the sculptural decoration, and the scalloped top that doubles as a guardrail for the viewing platform. He also reestablished a great hall in the attic, which Chalgrin had originally intended to be a museum. Projects for a quadriga on top of the arch were revived, and a design by Alexandre Falguière was so well received that a full-size plaster version of it was installed atop the arch, where it remained for four years until it more or less melted in the rain. Ultimately, this and all other projects for adding to the arch were abandoned, and the top of the arch today is simply a platform for viewing Paris.

Ceremonies at the Arch

It was only in 1840, when Napoleon’s ashes were brought back to France and carried under the Arc de Triomphe, that the emperor who commissioned it was finally recognized at the arch. A crowd of half a million participants looked on, and a ceremony on Napoleon’s birthday was held every year after his nephew was named emperor (Napoleon III) in 1851; they were discontinued when he was overthrown in 1870. In 1854, the present circular plaza, 860 feet in diameter, was created with its star pattern. The greatest celebration ever to occur at the arch was the funeral of Victor Hugo, author of, among many other books and poems, *Notre-Dame de Paris* (better known in English as *The Hunchback of Notre Dame*) and *Les Misérables*. His body lay in state under the arch on a catafalque designed by Charles Garnier, architect of the **Paris Opera**, and was taken, on May 29, 1885, in a huge procession, to its final resting place in the crypt of the Panthéon.

In 1919, the arch was the setting for a ceremony and parade to the memory of the half-million soldiers killed in the First World War. Two years later, in January 1921, the body of an unidentified soldier from that war was placed in the tomb directly under the arch as a memorial to the “unknown soldier.”

An eternal flame was added two years after that. The Nazi occupation forces, who marched under the arch when they entered Paris, never interfered with the daily ritual around the flame of remembrance. Since August 26, 1944, when General Charles de Gaulle marched from the Arc de Triomphe down the Champs-Élysées, there have been annual celebrations with the Arc as a backdrop on both Armistice Day and especially on the anniversary of the beginning of the French Revolution, Bastille Day (July 14).

The Sculpture

The decorative reliefs on the arch, executed between 1833 and 1836 by a variety of sculptors, are far from uniform in style or quality. Of them, François Rude's (1784–1855) "Departure of the Volunteers," known popularly as "La Marseillaise," on the right leg toward the city center, is the best of all the sculptural decorations; and the winged female screaming at the enemy (representing the Genius of Liberty) at the very top of the relief is one of the most famous and recognizable figures in all French sculpture. The equally huge relief on the opposite side of the central opening, Cortot's "Napoleon's Triumph," is by comparison static and stylized.

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AUVERGNE, LATE ROMANESQUE

CHURCHES OF. *See* Issoire: Abbey

Church of St. Austremoine.

BAPTISTRY OF ST. JEAN

(ST. JOHN), POITIERS

Styles: Roman, and Merovingian (Early Christian)

Dates: Fourth, sixth, seventh, tenth, and thirteenth centuries

Architect: Unknown

The baptistery of St. Jean (St. John) in Poitiers is one of the oldest existing Christian buildings in France. Most authorities state that it was built about 360, possibly on the orders of St. Hilaire, the first bishop of Poitiers, but much of what exists today was a Merovingian and Carolingian (476–887) rebuilding of the original structure, and it was further modified around 1000 c.e. Even if the octagonal baptismal pool and the walls of the high central part of the structure up to the windows are the only extant parts of the original Roman structure, St. Jean is still a remarkable building and an important example from periods of French architecture that have otherwise left us relatively few significant buildings. In addition, the interior contains some excellent eleventh- and twelfth-century frescoes in the style of those in **Saint-Savin** and some quite different ones from the thirteenth century.

Christianity had been introduced into Poitiers, which had been a large, sophisticated Roman city, during the second half of the third century. (See **Saint-Savin-sur-Gartemps** for more on Poitiers.) About 320–340, Christianity became the dominant religion in the city, and the quarter in which St. Jean is located was transformed from a residential to an episcopal sector associated with the bishop of Poitiers. Recent excavations suggest that the baptistery was part of a complex of buildings that were built around 335 to 350, but the baptistery is mentioned for the first time in 1096. By the fourteenth century, it was referred to as a parish church rather than a baptistery,



Very few buildings survived in France from the five centuries following the dissolution of the Western Empire. The Baptistery of St. John (St. Jean) in Poitiers is, therefore, an especially important example of French Early Christian and Merovingian architecture.

and by the fifteenth century, it was in ruins, which the archbishop's council authorized funds to repair.

Subsequently, it barely survived destruction at least twice. After the French Revolution, it was declared national property in 1790, and the city librarian saved it from demolition but not from becoming a weapons storehouse and then a bell foundry. It was threatened again in 1822, when a new road would have required its demolition. The street was detoured around it when the government bought the baptistry and, in 1824, funded an initial restoration and transformation into a museum of antiquities from the region, especially Merovingian sarcophagi. A more systematic restoration was carried out from 1854 to 1859. For nearly a century and a half, however, the building remained isolated in the middle of a street intersection. Finally, in 1988, these streets were moved away from the baptistry, which is now surrounded by a lawn.

The Exterior

The dominant central section of the baptistry, a tall rectangular structure, roughly 32 by 50 feet, was probably built first, around 350–360, but it is immediately apparent that this block was remodeled several times. Additions of varying shapes, sizes, periods, and types of construction were attached to its four sides, and the top is of a very different type of construction than the lower two-thirds. A large rectangular block, about 20 by 23 feet, was quite obviously grafted onto the middle of the east side of the building, and small, low semicircular *apses* of very neat (relatively modern) construction were added to the north and south sides. A large five-sided block with stone corners and stuccoed sides on the west side is now the entry. Low buttresses, also quite obviously added later, reinforce the corners of the rectangular east apse and the northeast and southeast corners of the main building. Except for some decorative brick insertions at the tops of the main walls (and the plastered surfaces on the west), the building is constructed of stone. Large sections of all the walls, especially their lower parts, have been restored.

The walls of the main building are rather plain up to the second of three projecting horizontal bands (stringcourses). Between the second and top bands are decorative elements. The gable ends of the main block are treated like *pediments* (a triangle framed by horizontal and diagonal cornice moldings). Most of the decorations, including the cornices, are in bad shape; many have been heavily restored. Brick inlays are mixed with brick-shaped stones on the top level; cubical stones and brick-shaped stones are mixed in lower sections. These changes in masonry patterns and sizes of stones make it relatively easy to see the various periods of construction and restoration.

Though sparse and amateurish compared to similar elements in most Roman architecture of the fourth century and earlier, the decorative elements on the upper parts of the walls are among the most interesting aspects of the building's exterior. Four *pilasters* (flat strips representing the flattened shafts

of columns) approximating the *Corinthian Order* sit on the middle horizontal band of the east, north, and south walls of the central block. Between the outer pair of pilasters, which have been shortened, as if they were cut down from some other building and reused here, are round windows (oculi). Above the oculi on the end walls are triangular niches, and between the central pairs of pilasters is a semicircular niche. None of the triangular niches is quite centered over the pairs of pilasters, and the pilasters are neither evenly spaced nor quite vertical.

The relatively crude decoration suggests that the upper walls were rebuilt after the decline of fine Roman craftsmanship in the fifth century, and before it had been relearned during the tenth and eleventh centuries. Decorations in the pediments—abstract roses, stars, geometric patterns, and flattened crosses—are characteristic of Merovingian but not Roman art or architecture, further evidence that the upper walls were rebuilt during the seventh (or perhaps sixth) century. The exterior of the rectangular apse on the east side of the building, though heavily restored, looks to be of the same period as the upper part of the central hall.

Even though the large room attached to the west side of the main baptistery looks like an extension of it in plan, its form and construction (cut-stone corners with stucco-covered rubble masonry construction in between them) shows it to be from a different, later period. Although the same length as the main baptistery space, the western addition is considerably lower and polygonal in form. The central door, now the main entry to the baptistery, is modern.

The Interior

Once through the entry, a modern visitor descends a steep flight of eleven steps to get from modern ground level, which has built up several feet since antiquity, to the original, Roman floor inside the building. St. Jean's central room is, therefore, a surprise, much higher than the exterior suggests. Also different on the interior is the eastern apse, which is five-sided on the interior but rectangular on the outside. Numerous freestanding columns set close to their surface decorate the walls of the north, south, and east sides of the main room. Their capitals are all different, some more finely carved than others, indicating that columns and capitals were reused from Roman buildings. Additional, smaller columns on the upper parts of the walls re-create the patterns of the pilasters on the exterior.

The Chronology of Construction

Because of an inscription that existed in the baptistery until the end of the eighteenth century, the epitaph of Claudia Varenilla, the wife of a Roman legate, who died in 159, it was long thought that the baptistery had originally been a second-century mausoleum. When E.-M. Siauve conducted the first archeological research in 1803, he hoped to find Claudia Varenilla's sarcophagus, but he instead found an octagonal basin below the floor. It was

large enough for two humans to stand in and made of “exceptionally hard concrete,” a water-tight, rose-colored concrete developed by the ancient Romans similar to that used in the water course of the **Pont du Gard**. At some point, the upper steps of a stairway leading to the floor of the basin had been destroyed, the basin filled with rubble (parts of columns, capitals, and other architectural ornaments), and the room repaved. Siauve also found a channel that connected the basin to a disused ancient Roman aqueduct. The basin was quite demonstrably a *piscine*, the French term for the pool used by early Christians who practiced baptism by immersion. (Although in modern French, *piscine* means “swimming pool,” its primary definition was “fish pond.” The term is, therefore, doubly appropriate for a Christian baptismal pool since a fish was an early symbol for Christ.) Unfortunately, after Siauve’s excavations the baptistry became variously a storeroom, a soup kitchen, and a bell foundry. Foundry workers used the *piscine* for casting the bells, and damaged it further. They also amused themselves by throwing stones at column capitals in the building and breaking them up.

Once the baptistry was purchased by the government in 1834, conservation and restoration began. The main window of the apse, which had been turned into a doorway, was restored and new entry steps were constructed down to the ancient floor level. Beginning in 1852 and continuing until 1859, the architects Joly-Leterne and Dupré carried out an extensive restoration, careful by the standards of the time. They replaced deteriorated masonry on the outside, stone by stone, with replacements that in their judgment matched the originals in size and shape. They reconstructed the small, semi-circular apses that had disappeared from the north and south sides—a small house with a fireplace had been built against the south side—on foundations they had uncovered. On the interior, they rebuilt foundations, removed some of the Gothic ornaments that had been added, restored cornices and moldings, and turned the damaged capitals so that the best preserved parts faced outward. Finally, they built the buttress extensions to the eastern parts of the central space and the apse to shore up these walls and dug out an area around the exterior of the building to protect against water infiltration.

Excavations in 1890 uncovered foundation walls of earlier and neighboring buildings, as well as of parts of the original structure that had disappeared. These excavations revealed that the polygonal western room was originally rectangular. The corners had, in effect, been sheared off at an angle to create the present, and probably much lower, shape. There had been three small rooms preceding it in its original form, the central one having been an entry porch with pairs of columns on three sides and the doors of the baptistry on the fourth. Other pieces of walls that were found at this time are more difficult to interpret, especially since some of them are parts of the buildings that preceded the baptistry but were torn down when the quarter was transformed from residential to episcopal.

The original, fourth-century baptistry was, therefore, quite different from the structure we see today. It was not freestanding, but built into sur-

rounding structures, though the central baptismal space towered above them. It had no apses on the sides or toward the east, and those entering went through three successive zones, with the view to the main space blocked by a wall, presumably to control even visual access by the uninitiated. Entry to the central baptismal space would have been through openings to either side of the central wall.

It would appear, then, that the original, large rectangular main structure was part of a much larger complex of buildings, all of which have disappeared. It was radically modified in either the sixth or seventh century (depending on the authority), at which time the original high windows were partially blocked up, creating the circular windows that we see today. Decorations were incorporated into these upper parts, using sections of earlier buildings and brick incrustations, as well as new carvings. The main apse to the east and the little apses to the north and south were also added at this time, though in this version, they were probably rectangular. It is impossible to know whether the baptistery was rebuilt because it was in a ruinous state, because the liturgy had changed and baptisteries were now included with churches, or simply because tastes had changed.

The western, rectangular room and the three little rooms that preceded it were torn down in the tenth or eleventh century and replaced with the polygonal structure we see today. At this time, the partial wall separating the east and west rooms was changed to create the three large openings that now connect the spaces, and columns and capitals from ruined buildings were reused to decorate the interior. Painted decorations on the interior are mostly of a very high quality and from the tenth through thirteenth centuries. In the baptismal or main room, they represent the Ascension.

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BEAUBOURG CENTER. *See*
 Pompidou Center.

BIBLIOTHÈQUE NATIONALE FRANÇOIS MITTERRAND, PARIS

Style: Modern (Neomodern)

Dates: Competition, 1989; Construction, 1992–1996;

Inauguration, 1997

Architect: Dominique Perrault (1953–)

France's new central research and general reference library was built to be the world's largest and most technically advanced. It was the last of the *Grands Projets*, a building campaign started in 1971 with the **Pompidou Center**, that rivaled King Louis XIV's building projects. The library is the grandest and most expensive of the *Grands Projets*, and it remains the most controversial. Popularly called the TGB—*Très Grande Bibliothèque* (Very Large Library), a pun on the TGV, France's high-speed trains—the library deserves the description “very grand.” More than 12 million books can be accommodated on more than 3 miles of bookshelves; 3,590 readers can be seated at tables and desks at the same time; the entry esplanade is as large as the **Place de la Concorde**; and the central garden, around which the reading rooms wrap, is as large as the Jardin du Palais Royal near the old National Library.

The old Bibliothèque Nationale, with its magnificent reading room by Henri Labrouste, had long since become far too small to accommodate either the number of scholars wishing to do research there or the increasing number of books, manuscripts, and other materials acquired each year by the library. It took days to retrieve books that had to be warehoused around the Paris area. In 1989, a government committee invited twenty architects to compete for the commission to design a new library. From the submissions, a new committee, chaired by I. M. Pei, architect for the renovation of the **Louvre**, selected four projects; it particularly commended Dominique Perrault's proposal. President Mitterrand agreed, and Perrault was awarded the commission on August 21, 1989. He was only thirty-six years old at the time, relatively unknown, and, exceptional among the architects of the *Grands Projets*, French. Mitterrand inaugurated the new building, still empty, on March 30, 1995, just weeks before leaving office as president of France. He died a few months later on January 8, 1996. As his legacy to France, it was named in his honor.

Perrault's Concept

The site for the new library, the Tolbiac railroad yards, is on the east side of Paris along the Left (south) Bank of the Seine River. It is across the river



Bibliothèque Nationale François Mitterrand (The French National Library), Paris. Dominique Perrault won an international competition in 1989 to replace the beloved old library. Conceived as the largest and most technically advanced library in the world, Perrault's building is controversial, not least because it stores many of the books in these four glass towers.

from the Bercy district, another industrial site that was being developed for governmental and cultural activities: the immense Ministry of Finance, moved there from the Louvre as part of Pei's Grand Louvre scheme; an indoor sports facility; and the Parc de Bercy. Since the new library was conceived as the key monument in the revitalization of this whole area of east Paris, President Mitterrand thought that it needed to be a very visible symbol, even from a distance. This, ultimately, is why he chose Perrault's scheme, in his opinion the most effective image.

Perrault conceived the library as four L-shaped towers rising from the four corners of a sunken central garden that had reading rooms and lobbies arranged around it on two levels. He used several metaphors for the towers: half-open books; book silos; vast racks with countless shelves; and, evoking Jorge Luis Borges, vertical labyrinths. They were to be sheer-glass prisms, 330 feet tall, whose surfaces would multiply reflections. Lit up at night, they would become beacons; by day, the gradual accumulation of knowledge would be visible as the towers filled with books. For Perrault, the central garden, sunk below the platform or esplanade from which the towers spring, represented a tranquil space away from the noises and distraction of the city, a place for contemplation analogous to the cloister in a monastery or a Medieval secret garden.

Perrault's Concept as Built: Changes in the Competition Concept

As is frequently the case in competitions, Perrault's scheme was immediately derided: Books should be protected from daylight, not exposed to it; the book towers were too large for the center of Paris; why put the books in towers, from which there are magnificent views of Paris, and the readers underground? How were books, many of them precious, going to be moved from the book "silos" to the readers without damaging them? What would happen to the beloved (but woefully inadequate) old Bibliothèque Nationale on the rue Richelieu?

Knowing he was fatally ill, Mitterrand wanted the library built quickly, and he wanted few obvious changes to Perrault's scheme, so the building as constructed looks much like the competition entry. Many of the criticisms were met, however; the towers were reduced in height to 260 feet, and opaque, fire-resistant panels sheathed in wood were installed several feet behind the glass walls on every floor where books are stored. This dramatically reduced the square footage in the towers available for bookstacks. At the same time, it was decided to move *all* printed books from the rue Richelieu site to the new building. The podium now had to accommodate half of the book storage and be made correspondingly larger.

Organization of the Library

Names of the four book towers correlate to a division of the book collection in four thematic areas: the Tour des Lois (Tower of Law) for law, economics, and politics; the Tour des Nombres (Tower of Numbers) for science and technology; the Tour des Lettres (Tower of Letters or Literature) for art and literature; and the Tour des Temps (Tower of Time) for philosophy, history, and social sciences. There are also audiovisual and bibliographic research departments, and one of the world's finest collections of rare books.

The Esplanade

Perrault's minimalist approach to architecture gives few clues to the library's entrances. Except on the south side, there are no entries at street level, nor are the entries to the library at the bases of the towers. Rather, entry to the library is down two gently sloping, moving sidewalks at either of the short sides of the esplanade. To get to them (except on the south), the reader must climb the stairs that wrap continuously around the podium, which is 1,230 feet long—nearly a quarter of a mile—and, on the Seine (north) side of the library, 30 feet above the sidewalks. Both esplanade and stairs are paved with thick planks of tropical wood, a decision that displeased many.

Reading Rooms

Two levels of reading rooms extend along the long sides of the garden. The upper level reading room, which is directly accessible from the recep-

tion halls at either end of the library, is open for a small fee to anyone at least sixteen years old, and provides 1,645 seats spread over a quarter million square feet. The collection is broad in scope, adequate for academic studies and general knowledge. Books are in open stacks.

Reading rooms for researchers who can show that the material they need is available nowhere else are on the lower level. Entry is from the reception, down escalators that descend nearly 100 feet in the most dramatic spaces in the library, great concrete shafts ten stories high, whose walls are hung with a woven steel mesh resembling—and called by Perrault—chain mail. The research library is organized around the same thematic departments as the towers.

Almost 1,900 readers can be seated in the 280,000 square feet of the research library. Ceilings are 43 feet high, about the same as Labrouste's reading room in the old National Library, and hung with the same metal fabric, developed for industrial conveyor belts, that is hung from the walls of the entry shafts. Some commonly used books are arranged in open stacks in the reading room, but most are kept in the closed stacks, either in the towers or in a ring around the reading rooms. Books requested by computer are delivered to 150 different points around the reading room by an automated system of small containers traveling on 5 miles of track. In principle, no book takes more than twelve minutes to get from the bookstacks to a distribution desk, though when the system was first put into operation, the delay was sometimes more than a day. The rare book collection is also housed on this level, its contents classified independently of the overall thematic divisions. An auditorium, six lecture rooms each seating fifty people, two exhibition areas, restaurants, cafeterias, and a gift and book shop complement the public areas.

The Garden

To re-create a section of the forest at **Fontainebleau**, 120 mature pine trees, some forty years old and weighing up to 12 tons, and 130 other trees (oaks, hornbeams, and birch) were planted in the garden. Unfortunately, not all have survived. The storms that so badly damaged the gardens at **Versailles** also toppled trees at the library. Although Perrault wanted the garden to be a place for relaxation and contemplation, library administrators felt that giving readers access to it would compromise security; therefore, only gardeners may go into it, except in an emergency.

Administration and Service

Services, technical facilities, and a 190,000-square-foot parking garage are located in rings that encircle the reading rooms. Administration offices are in seven of the lower floors of the towers, but the lowest two floors of the twenty-two-story towers are empty; they are the tops of the entry shafts to the research library, their glass walls serving as *clerestory* windows for the

shafts. The top two tower floors house mechanical equipment. A viewing “belvedere” atop the north-east tower is open to the public.

A Qualified Success

Everyone has applauded the rescue of millions of books from the remote warehouses and their assembly in one place. Most readers are delighted with the facilities in the reading rooms. Chairs, lights, and tables with computer access at every seat were all designed explicitly for the library and constructed of the highest-quality materials. Technologically, the library is at the cutting edge: Its collections of nontraditional digital images and texts and its audio-visual facilities are unsurpassed. There has been considerable criticism of several aspects of the library, however. Some see the minimalist glass towers as cold and inhuman, and many have reacted unfavorably to the extensive use of exposed reinforced concrete and stainless steel, despite the even greater expanse of wood in floors, partitions, and furniture. Corridors are almost frighteningly long and impersonal, and the symmetry of the building sometimes makes it difficult for readers to orient themselves. Workers complain they lose track of time and place due to the lack of windows in much of the building. Perrault described the esplanade as a public square comparable to the other great Paris squares such as the **Place des Vosges**, but in reality it is a barren windswept plane without focus or interest, not a place to stroll or while away time.

The neighborhood around the new library is rapidly being developed. There are plans for housing, a new 800,000–1,300,000-square-foot university center, an international business center, parks, schools, medical facilities, and shops. A projected bridge connecting the library with the Parc de Bercy across the Seine is under construction.

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BIBLIOTHÈQUE STE-GENEVIÈVE, PARIS

Styles: Structural Rationalist/Néo-Grec

Dates: 1838–1850

Architect: Henri Labrouste (1801–1875)

The Bibliothèque Ste-Geneviève (Library of Saint Genevieve) has one of the most important collections of old books and manuscripts in France. A masterpiece of nineteenth-century architecture, it contained the first large public reading rooms, and was one of the first major buildings openly and extensively to use an iron structure. The library's location, the Sainte-Geneviève hill, is the highest point in the Latin Quarter, the intellectual center of Paris since the twelfth century. Even during its earliest days in a nearby monastery, the library was closely connected to the nearby university and independent of the control of the bishop of Paris.

The Monastic Library

An inscription in the main staircase informs us that the Bibliothèque Ste-Geneviève was founded by the monastery of Saint Geneviève (patron saint of Paris). There were about 200 manuscripts in the first library in the monastery (in the thirteenth century), a respectable collection at a time when all books were handwritten. The library, like the monastery, declined in significance in the sixteenth century; but in 1624, Cardinal de La Rochefoucauld was named abbot of the monastery and gave it 600 volumes, the beginning of its remarkable collection. By the early 1700s, with continuous additions, especially the 16,000-volume library of the archbishop of Reims, the library was considered to be “the best and most complete” in France (next to the Royal Library). Like all religious institutions, the abbey was suppressed during the French Revolution. Its possessions were confiscated in 1790. One of the monastery's priests saved the library, which lost nothing but its name; it became “The Library of the Pantheon.”

At the very end of the eighteenth century, during the Directoire, the library was opened to the public. Books confiscated from emigres and other religious foundations were added. By the 1830s, the monastic buildings had become the Lycée (high school) Napoléon (now Henri IV). The monastic library had outgrown its available space, was not well adapted to students, and it risked collapsing on the students' dormitory below. A site near the abbey was chosen for a new building, and Henri Labrouste was named architect on June 18, 1838. The commissioner of public works laid the cornerstone on



Behind the austere facade of the Bibliothèque Ste-Geneviève (Library of Saint Genevieve; Paris, 1838–1850) Henri Labrouste created not only the first large public reading room, but also the first exposed iron structure in a major civic structure.

August 12, 1844, during the reign of Louis-Philippe. Construction was finished in 1850, and the library opened to the public in February 1851.

The Architect

Labrouste had built very little, but he had won the Prix de Rome, the five-year scholarship to Rome (1824–1830) that was the most prestigious award given at the École des Beaux-Arts, France's school of architecture. His studies with Jean-Baptiste Rondelet, Soufflot's assistant in constructing the Panthéon and Europe's preeminent architectural engineer, had convinced Labrouste that architecture and construction were interdependent. He subsequently advanced the theory of Rationalism, that is, of using the actual structure of a building as a major determinant of its appearance. His design for the library was the first example of his theory to be built.

The Building Program

From 1839 to 1842, Labrouste developed a proposal radically different from the conventional. Traditional libraries had few places for reading. Labrouste's had a large reading room for 600 students, a model for succeeding libraries, on the second story to maximize light and minimize humidity. He determined that a rectangular room was the most efficient shape. Since

the library needed to be as fireproof as possible, he minimized attached offices and staff apartments, which would feed a fire. There were shelves in the reading room for 120,000 frequently consulted books and closed stacks on the ground floor for 300,000 more. Labrouste's final plans were accepted September 21, 1842, and construction lasted seven years.

A Legible Architecture: Structural and Symbolic Functionalism

Labrouste's building was a new direction, both aesthetically and functionally. Sober to the point of austerity—there is almost no decoration—its facade is neither pretty nor even elegant. There are no classical *orders* and no reference to any buildings from the historical past. To many contemporaries, the building had no style. Labrouste wanted its functions and its real, undisguised structure to order his building. Any ornament was to derive from the latter and help the public understand the former. They should be able to read his building “like a book.” All these are characteristics of most modern, twentieth-century architecture.

The entry, which is obvious, and high windows are the only things that break up an otherwise blank ground floor; blank to protect the main book stacks directly behind them that are lit by the high, identical round-arched windows. A band of leafy garlands above the windows is nearly identical to one on the Panthéon across the street, Labrouste's gesture of respect to the great monument. The second floor is a complete contrast. An arcade of nineteen arches springing from rectangular *piers* extends across its entire length, expressing a reading room, which occupies the whole floor. Inset between the piers are panels with the names of 810 famous authors engraved on them in three columns. Above the panels are large, arched windows. The panels correspond to 120,000 reference books in the bookcases that line the outer walls of the reading room; the high windows, which continue around the entire building, provide an even, direct light to the interior.

Labrouste was often criticized later in the nineteenth and especially in the twentieth century for not allowing his revolutionary use of iron construction on the inside to show on the exterior. Subsequent nineteenth-century structures, especially in France, had facades largely or completely of iron (and glass), but the only metal showing on the exterior is the window frames and the round metal disks (*paterae*) engraved with the monogram of Ste-Geneviève above each pier that indicate the ends of the iron trusses in the reading room. Labrouste was neither timid nor did he show any lack of intellectual or artistic rigor. His decision not to use more iron was based on sound architectural practice and reasoning. The reading room needed better insulation from sound and weather than an iron-and-glass curtain wall could supply, and better protection from fire. Also, cast iron is not a very durable material when exposed to the weather, thus, it is not very appropriate for the exterior of a monumental civic building. Finally, Labrouste recognized that his library facade needed to provide a respectful background for

the national shrine of the Panthéon rather than to draw attention to itself, which a cast-iron facade would have done in this context.

The Drama of Entering the Reading Room

Labrouste created a dramatic sequence of spaces for readers between the entry and the reading room. First was a somber hall that leads to the main stairs at the rear of the library. Busts of ten famous writers are arranged along both sides of the hall below frescoes of trees—Labrouste wanted a garden in front of the building, but there was not enough room. A single flight of stairs leads to a landing, above which is a copy of Raphael's famous fresco, *The School of Athens*. Two more flights, at right angles to the first, lead up to a second landing. After two more short flights of stairs, the solid entry doors to the reading room appear. Ceiling heights have gradually increased and the path has been increasingly better lit along the way. This carefully controlled sequence makes entry into the reading room exhilarating.

The Reading Room

The reading room is spacious (260 feet long, 55 feet wide, and 40 feet high) and flooded with light from the high windows on all sides. This daylight is so evenly diffused by a double row of semicircular *vaults* that even on cloudy days, very little supplementary artificial light is needed—especially important when the library was built and the only practical light for the library was from gas with incandescent mantles. The vaults are supported on curved iron *trusses*, one end of which rests on stone brackets atop the inside of the stone piers ringing the room. The other end of the trusses is supported on a single row of sixteen slender cast-iron columns that divide the room in half lengthwise. Even with the technical limitations of the time, Labrouste could have spanned the reading room with a single truss and eliminated the central columns, but that would have made the ceiling much higher and the room less humane, an important criterion for him. Also, a single vault (or a flat ceiling) would have been much less effective in diffusing light though the reading room.

Books in the gilded-wood bookcases that line all four sides of the library on two levels are the major ornament on the interior, though the webs of the trusses are not only structural, but are also treated decoratively as spirals of abstract plants with pointed leaves, and the stone pedestals for the columns are decorated with reliefs of heads.

The Library in the Twentieth Century

By 1934, the wooden bookcases in the closed stacks on the ground floor had been replaced with metal ones to increase capacity, and the library had expanded into a neighboring building in which, coincidentally, Labrouste had gone to school. A 1954 addition added supplementary shelves on seven floors;

a second extension in 1961 added more shelves, cataloging rooms, and a better distribution system for the books (which may not be checked out of the library).

Women were allowed in the library only in 1898, and then only with a request from parents or professors. Since 1930, the Bibliothèque Ste-Geneviève has been part of the university library system. Most of the original abbey's collection, which includes 4,000 manuscripts, 111,000 printed books from the fifteenth to nineteenth centuries, and seventeenth- and eighteenth-century periodicals, has been kept together. On average, around 12,000 books are added each year to the library's general collection of 3 million volumes; its Fenno-Scandinavian collection contains more than 140,000 books.

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CARCASSONNE (FORTRESS CITY), CARCASSONNE

Styles: Medieval, mostly Gothic, and Romantic

Dates: Fifth century B.C.E. through early twentieth century

Architects: Unknown; restoration by Viollet-le-Duc

Even though parts have been reconstructed, the *Cité* (the upper city) of Carcassonne is the largest and best-preserved Medieval castle in France. Built on an escarpment overlooking the east bank of the Aude River in Languedoc-Roussillon, southeast of Toulouse, it controlled the route between the Mediterranean and the Atlantic as well as a major road to Spain. Because of its strategic significance, the site was occupied as early as the fifth century B.C.E. It was occupied by the Romans, whose fortress was captured and rebuilt in the fifth century by the Visigoths. Their fortress fell first to the Muslims in 728, and then to the Frankish king Pepin the Short in 752.

For the next four centuries, Carcassonne was the capital of a fief held by the counts of Toulouse. They were overthrown during the "Albigensian Crusade," when the king of France sent 200,000 soldiers to crush what he considered a heresy centered in the region. The heretics took refuge in



Although heavily restored in the nineteenth century by Viollet-le-Duc, the French Medieval fortress city of Carcassonne looks much as it did 800 years ago.

Carcassonne, which Simon de Montfort besieged in 1209 and eventually took through trickery.

Later, King Louis IX (St. Louis) ordered the settlements that had grown up at the foot of the fortress walls destroyed and the Cité's inhabitants exiled. After seven years, they were allowed to return and given permission to build the present lower city of Carcassonne. Louis and his son, Philip the Bold, rebuilt the turreted and *crenellated* outer walls of the upper, fortress city, including the Porte (gate) Narbonnaise, in approximately their present form. They also added to the inner walls. The Porte Narbonnaise, the only entry into the Cité accessible by cart or carriage, is a masterpiece of Medieval military architecture, with two towers and a double wall that would catch soldiers besieging the fortress in cross-fire from several directions. The rebuilt fortress was so well constructed that it was never taken. Even during the 100 Years War, Edward the Black Prince could only burn the lower city in 1355, when he failed to take the citadel.

The Ramparts of the City

Of the two walls around the Cité, the exterior has nineteen towers, the inner thirty-two. For the lower parts of the inner walls, Louis's and Philip

the Bold's men used the Roman walls, constructed of large blocks of stone fit without mortar, and the Visigothic reconstructions. The outer walls, however, are entirely from the reigns of Louis IX and Philip the Bold (1228–1239), smooth stones characterizing the earlier construction, and stones with rough faces that better withstood battering, the latter. A broad, grassy space between the two sets of walls, the *lices*, was used as a parade ground and to trap assailants. Postern gates permitted passage from the interior to the lices for sudden exits.

The Chateau

Carcassonne's castle, the Château Comtal, was incorporated into the Visigothic rampart about 1125. It was the last defense of the city, surrounded by a moat, and protected by a barbican (a secondary fortress). Carcassonne's defenders had, therefore, three sets of defensive walls. The introduction of cannons into warfare made the castle ineffective and, unlike the fortress walls, it was allowed to fall into ruin.

The St. Nazaire Basilica

The major church within the walls of the Cité, the basilica of Saint-Nazaire, was built from 1096 to 1150 by the viscounts of Carcassonne and Béziers and consecrated in 1096 by Pope Urban II. Its simple, severe, and *barrel vaulted* Romanesque nave contrasts with the *transept* and *choir*, Gothic structures constructed from 1269 to 1320. Refined, beautifully proportioned, and luminous, they are reminiscent of the **Sainte-Chapelle** in Paris. Viollet-le-Duc reconstructed the fortified west facade, erroneously thinking it was part of the Visigothic walls. The stained glass, some of the finest in southern France, is from the fourteenth, fifteenth, and sixteenth centuries.

Viollet-le-Duc and the Restoration of Carcassonne

On May 22, 1846, the great writer Prosper Mérimée, director of Historic Monuments, charged Viollet-le-Duc, who had already restored St. Nazaire, to prepare a report on the restoration of the Porte Narbonnaise, which he submitted on January 6, 1849. Discussions continued until 1851, mostly concerning whether the army or the Department of Historic Monuments had jurisdiction over the fortress. Up to that time, the army had kept the outer walls more or less in repair. From 1852 until his death in 1879, Viollet directed reconstruction, which was continued by his pupil, Boeswillwald.

Viollet believed Carcassonne's fortifications were the most remarkable model of Medieval military architecture, and carefully documented their existing conditions with meticulous drawings that are invaluable to historians today. Although frequently criticized for restoring buildings to a uniform condition that never existed, at Carcassonne, at least, he scrupulously kept distinct the differences between periods of construction and reconstruction. Though he, like his contemporaries, was sometimes wrong in attributing spe-

cific parts to the Visigoths instead of to the Romans, recent studies have shown Viollet to be essentially correct in his restorations, especially of the crenelations and the steep slate roofs. They show the influence of architecture from north of the Loire Valley, which is hardly surprising since they were created by Philip Augustus's engineers.

So much of the city results from Viollet's rebuilding that it was submitted for inclusion on World Heritage sites as nineteenth-century rather than Medieval architecture. Today, the Cité counts about 1,000 inhabitants, while the lower city, a commercial center for the wine-producing region, has about 40,000.

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CARNAC ALIGNMENTS, NEAR CARNAC, BRITTANY

Style: Neolithic

Date: Unknown, probably built 5,000 to 6,000 years ago

Architect: Unknown

The most astonishing and intriguing prehistoric monuments in France are the thirty groupings of giant granite slabs—*menhirs* ("long stone" in the Breton language)—found in Brittany. Some of the parallel rows in these alignments, as the arrays of menhirs are usually called, stretch more than three quarters of a mile across the gently rolling terrain. Seven near the city of Carnac are the most impressive. They were erected at least 6,000 years ago, during the Neolithic period, by a culture that preceded the Celts (who dominated France before it was conquered by the Romans). Thus, the alignments are 1,400 years older than the Egyptian pyramids at Gizeh, and the menhirs comprising them, some of which weigh between 100 and 280 tons, are heavier than the stones in the Egyptian pyramids. No one is certain why the alignments were built or how they were used.



The “alignments” at Carnac, probably older than the Egyptian pyramids, are the oldest monumental constructions in France. Some of the lines of large stones (menhirs) extend nearly three-quarters of a mile across fields in Brittany.

Traditional Explanations Versus Scientific Dating of the Alignments

According to some local legends, St. Cornelius, identified with a third-century pope, created the alignments by turning a Roman army to stone in order to escape. (In some variations, the stone soldiers get to drink once a year, on Christmas Eve.) Other legends explain the alignments as a Celtic cemetery, with big stones for rich Celts and smaller stones for poor, or as temples for Druids, the upper or priestly Celtic class. The St. Cornelius legend is obviously fanciful, but “Celtic” remains have been found in burial sites adjacent to the alignments and in excavations at the bases of the menhirs. This evidence of Celtic presence is, however, more recent than burnt offerings from dedication ceremonies connected with the raising of the menhirs, which were recovered during excavations of menhir foundations. Carbon-14 dating, confirmed and refined by newer techniques (thermoluminescence), established that those ceremonies took place long before the Celts arrived in Brittany. In the end, we know little more than the nineteenth-century French writer, Gustave Flaubert, who wrote in 1847 (in *Par les champs et les grèves* [*Over Fields and Shores*]): “if I were to be asked [my opinion about the alignments] I would give one, irrefutable, undeniable, irresistible [answer]. . . . It is as follows: the stones at Carnac are large stones.”

Of the seven alignments near Carnac, four—Le Ménec, Kermario, Kerlescan, and Le Petit-Ménec—are especially impressive and complete. They are a few hundred yards apart, raising the question of why so much effort

was duplicated in such a small area. (The other three alignments in the region—Erdeven, Sainte-Barbe, and Le Moulin at St-Pierre-Quiberon—are somewhat smaller and more fragmentary.) The roughly oblong granite slabs in all the alignments are arranged, 18 to 36 feet apart, in nearly parallel rows oriented approximately, but not precisely, northeast to southwest. It appears that the most important criterion for the builders was running the rows counter to the slope of the low hills in the region rather than along the contours; that is, the geography of the site appears to have been more important than solar or any other cosmic relationship when laying out the alignments. Stones get larger, at first imperceptibly then dramatically, as the rows climb up the slope. At the top of the hill, the menhirs are set close together to create an enclosure, whose size and shape varies between alignments. There are some other variations, too.

Ménec

The Ménec alignment is farthest to the west and closest to the modern city of Carnac. More than 1,000 of its menhirs, the tallest of which stands 12 feet, remain erect. They are arranged in eleven rows, the longest of which stretches more than 3,000 feet from the remnants of the oval enclosure that once crowned the hill at the western end of the rows. As the rows march down the hill, the ordering of the stones becomes less precise, and the southernmost row is not straight, but curves back across its neighbor. It is now difficult to distinguish the oval enclosure, because a relatively modern village was built in the middle of it. Measuring 295 by 230 feet (90 × 70 meters), this enclosure is not centered on the alignments but is shifted slightly to the south. A transverse line of stones plus several isolated stones at the northeast end of the alignment suggests that, in contrast to the usual scheme, at Le Ménec there was a second ovoid enclosure at the low end of the alignment.

Kermario

Kermario alignment, a few hundred yards to the east, is the longest—one row extends about 3,600 feet (1,100 meters)—at nearly three quarters of a mile. Kermario has ten rows of menhirs, again set in only approximately straight, approximately parallel, and approximately southwest-northeast-oriented lines. Although there are gaps of missing stones, 982 menhirs remain standing. As at Le Ménec, there was probably an enclosure at the western end of the alignment on the hill next to the largest menhirs, but it has disappeared.

Kerlescan and Le Petit-Ménec

Even further to the east is the smaller but better-preserved Kerlescan alignment, whose form is more readily apparent and quite different from the others. It has 579 menhirs in thirteen rows arranged in an overall fan shape, 460 feet (140 meters) wide toward the northwest end and more than 656 feet (200 meters) long. The rows do not even approximate parallel lines, and two

of the southernmost lines curve back and cross their immediate neighbors. As in the other alignments, the menhirs decrease in size, from about 10 feet tall closest to the western enclosure to less than 3 feet at the ends of the rows, and the number of lines decreases from thirteen at the top of the hill to nine at the bottom. The enclosure on the northwest end of the alignment is a rectangle, 260 by 296 feet (80 × 90 meters), which is created on three sides by menhirs 6 to 8 feet tall and on the fourth side by a burial mound (barrow or tumulus). Although the hill on which it is set is only about 20 feet above the eastern ends of the lines, the rise is sufficient to set off the enclosure. Le Petit-Ménec, 400 yards further to the east from the Kerlescan lines, is the smallest of the four Carnac alignments.

Materials and Construction of the Alignments

Most of the menhirs were quarried near where they were erected, though a few were dragged as much as three miles. The granite formations around Carnac are layered, making it relatively easy for the builders to separate the menhir blocks from their bedding planes, despite limited technology (no metals, no wheels, and no pulleys). Until they exceeded a few dozen tons, such blocks could be dragged by several men to the alignments, but larger stones posed significant problems to quarry and move, especially given the weakness of the wood and rope available at the time. The Neolithic builders, however, had obviously developed techniques for moving very large stones. A fallen menhir at Locmariaquer was 66 feet (20 meters) high and weighed 280 tons, heavier than the Egyptian obelisk in the **Place de la Concorde**, which was erected in the nineteenth century to much fanfare; it weighs 220 tons. Getting the menhirs upright once at the building site was trickier and took more effort than transporting them, and if they fell over once erected, they risked breaking. (The granite blocks are more fragile than they look.) Yet, rarely was more than 10–15 percent of the block buried in the ground. Packing stones around their bases steadied the menhirs and helped keep them upright, but this technique made them highly vulnerable to falling over due to erosion, a continuing concern.

Megalithic Culture

Although the alignments in Brittany (and Stonehenge and the Avebury Circle in southern England) are among their most impressive Neolithic monuments, the megalithic (“large-stone”) culture that built them left thousands of less-imposing examples all over Europe (Portugal, Malta, and along the North Sea shores, as well as other places in France). These peoples appear to have begun erecting megaliths during the first half of the fifth millennium B.C.E., and quit around the beginning of the Bronze Age (around 2000 to 1500 B.C.E.). Monuments around Carnac are probably so numerous and impressive because it was a crossroads of the principal currents of Neolithic culture; that is, cultural developments from Central Europe mixed with those from the Mediterranean basin in this area. Around 8000 B.C.E., the local

hunter-gatherer society was replaced by an agrarian culture whose visible architectural sign may be the alignments. Houses from the period, perhaps no more than seasonal huts, would have been built of perishable construction materials and would have completely disappeared. Also, sea level has risen 15 to 20 feet since the megaliths were erected, and settlements on the littoral plains around the monuments would now be at the bottom of the sea and may yet be discovered.

A few skeletons of the megalith builders have been found. (Breton soil, which is very acid, dissolved most skeletal remains.) They indicate that the builders of Carnac were slender and not much taller than 5 feet, 2 inches. They must have been well organized and, given the size of the menhirs, their leaders also must have possessed excellent powers of persuasion. Based on the experience of masons today and on recent experiments, there must have been a population of several thousand in the Carnac area to be able to erect the menhirs in the alignments.

Some tombs—chambers created by arranging stones inside mounds of earth attributable to the same culture—have been found, but they appear to have been built much earlier than the alignments and are not necessarily found near them. The rows of menhirs were, therefore, probably not closely related to burials. The symbolic and ceremonial functions of the alignments remain mysterious, though there have been many surmises.

The Meaning of the Alignments

Obviously, none of the traditional explanations for the alignments are valid: They were not the remains of Caesar's camp, or his troops turned to stone by a saint, or a Celtic cemetery, and they were probably not some sort of complex construction for calculating and predicting cosmic events such as solstices, equinoxes, or eclipses of sun or moon. The northeast-to-southwest orientation of the rows of stones is only approximate, and the spacing and arrangement of the menhirs is not regular or precise enough for such calculations. The enclosures that appear to some experts to indicate equinoxes and solstices have been so heavily restored that one cannot be sure about the accuracy of the original placement of stones until further research is done. An ingenious theory that the Great Locmariaquer Menhir was the gnomon of a huge astronomical computer that included the alignments at Carnac is extremely unlikely since the Great Menhir was only one of several stones in an alignment that has otherwise disappeared. It was almost certainly toppled and broken into pieces before the alignments at Carnac were constructed. Contrary to appearances, not all the menhirs in an alignment were erected at the same time, and research has shown that stones were frequently rearranged, cut up, or reused in other monuments. What we see may represent 2,000 years of modifications of the original layout. "Restorations" in recent times have also changed the arrangements of the menhirs, and not just in the enclosures.

There are four menhir shapes: simple slabs, slabs with a bulge near the

bottom, slabs that taper near the bottom, and, finally, slabs with a projection around their middle. These shapes may have been symbolic, but most likely they are a result of the different rock formations from which they were taken rather than artificially created symbols. It is still possible that these naturally occurring shapes were chosen for special symbolic locations. Engraved decorations, mostly linear designs of snakes, weapons, shepherd's crooks, axes, and the like, can be found on isolated menhirs, but not on those incorporated into the alignments. If any such decorations once existed, 6,000 years of weather have erased them.

Many scholars now believe that the rows of menhirs were simply processional alleys leading to the enclosures, oriented so that the rising sun followed along the alleys in morning, and the setting sun bathed the enclosures with light in the evenings, creating a sacred way and a "holy-of-holies." The alignments would, then, have functioned much like later religious sanctuaries such as Egyptian temples or even Medieval churches; that is, a long processional avenue leading to a clearly demarcated, especially sacred space. The increase in size of the menhirs as they neared the enclosure produces a sort of reverse perspective that made the holy-of-holies appear closer than it really was and the distance walked to get to it seem longer than first perceived.

Curiously, the rows of menhirs at Carnac did not draw much attention until the mid-1700s. From the 1830s, attempts were made to preserve the sites and to reerect fallen menhirs, but the first truly scientific measurements were not made until the beginning of the twentieth century. By 1990, there were so many visitors to the sites that access had to be regulated, and for most of the year, it is no longer possible to walk among the megaliths.

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CENTRAL MARKETS OF PARIS.

See Les Halles (Central Markets).

CHAMBORD: CHATEAU, LOIRE VALLEY

Style: Early Renaissance

Date: begun 1519

Architects: Leonardo da Vinci and other unknown architect(s)

“Neither Gothic nor Modern,” wrote the architect A. Félibien more than a century and a half after the Château de Chambord was built. “One may [nevertheless] consider it one of the most magnificent constructions that the kings of France have built up to now” (Pérouse de Montclos 1997, 255; author’s translation). Not merely magnificent, Chambord is a key monument in the transition of French architecture from Medieval to Renaissance, one of the first French buildings in France to show Italian influence. That influence, however, is largely limited to the imposition of symmetry on a plan derived from the Medieval castle. Ornament, though derived from Italian Renaissance examples, was executed by local craftsmen either unfamiliar with authentic Renaissance ornament or unwilling to copy it and is neither Medieval nor quite authentically Italian Renaissance. Part of Chambord’s interest may be due to its transitional style, but it is also fascinating because it is—still—one of the largest, most splendid castles in France, a rectangle 510 by 385 feet (one and a half times the size of a typical American city block). Finally, it is of interest because of the spectacular double-spiral central staircase that most scholars now agree was designed by Leonardo da Vinci, whom King François (Francis) I brought to the Loire Valley. Da Vinci also may have consulted on the plan.

Introduction of the Renaissance Style in France

Renaissance art and architecture had been fashionable in Italy for nearly a century when the French kings Charles VIII in 1495, Louis XIII in 1499, and François I in 1515 were exposed to the new style during their Italian military campaigns. French arts seemed, by comparison, outdated and unfashionably “Gothic,” which meant “barbaric” at the time, especially French castles and manors, which were a combination of walled courtyard with defensive towers at the corners and a tall tower, the keep or *donjon*, at the center. This combination of Medieval fortress and aristocratic residence, already made ineffective by the introduction of gunpowder and new forms of warfare, was changing even before Chambord was built. Fortresses (*châteaux forts*) and manors (*châteaux*) were in the process of becoming separate types of structures.



King François I probably consulted Leonardo da Vinci when he built Chambord as a hunting lodge. Begun in 1519, it was one of the first French buildings to show the influence of the Italian Renaissance. Its fantastic roofscape was a “city” from which women in the court could watch the hunt.

In manor houses, that is, aristocratic residences, windows were getting larger, living quarters moved to the rear of the courtyard (and arranged for comfort rather than defense), the sides of the court reduced to low wings (as seen in several manors in the Loire Valley, where the nomadic French court preferred to live in the late Middle Ages), the wall opposite the residence removed, and both interiors and exteriors decorated. Charles VIII had been first to introduce Italian influence to these changes by bringing, around 1495, two Italian architects, Fra Giocondo and “Domenicque de Courtonne,” and at least twenty-two Italian artists and craftsmen to his residence at Amboise in the Loire Valley. His son, François I, had a wing of the nearby royal chateau (manor) of Blois rebuilt in a modified Italian style in 1515.

François I and the Building of Chambord

Fascinated with architecture (besides Blois, he transformed Amboise, Fontainebleau, and Saint-Germain-en-Laye, and began rebuilding the Louvre in Paris), François seems to have intended Chambord to demonstrate that a young king who had made his reputation through military conquests also could be culturally magnificent and modern. He had already commissioned Leonardo da Vinci to design a new city and palace at Romorantin, to the south of the Loire, but instead, in 1519, François began construction of Chambord. It was conceived as a royal hunting lodge, not a

royal residence. Charles V, the Holy Roman Emperor, was the only head of state ever to visit. At the time of his visit, twenty years after construction began, only the residential block and part of the east wing were finished and there were only 6,000 of the eventual 13,000 acres in the park.

Chronology of Chambord's Construction

Before work on the new chateau could begin, the site, a swampy piece of land at the bend in a small tributary of the Loire River, had to be cleared and new foundations constructed. They were extremely complicated, both because the site was so marshy and because the new building was so large and heavy. First, oak pilings were driven to a depth of 40 feet to support a mat of stone and mortar the same size as the chateau. On the mat, foundation walls, 15 feet high and 13 feet thick, were built to support every major internal and external wall of the chateau. Building was halted in 1525, when the king was taken captive in a battle and sent to Spain as prisoner. Upon returning to France, he moved the court permanently to Paris, and construction of Chambord continued slowly for decades. The chateau was not finished in François' lifetime. In all, he spent no more than eight weeks in it, probably for the last time in the spring of 1545, two years before he died.

Little more was done for 120 years because his immediate successors almost never visited the chateau, which was, in effect, abandoned. Finally, Gaston d'Orléans, brother of King Louis XIII, made urgently needed repairs to the chateau and had a 20-mile-long wall erected around the park, which he increased to its present extent. In effect, he saved the chateau from falling irretrievably into ruin. (The king had given the chateau to his brother, who was frequently involved in plots against the crown, to keep him away from court.)

Gaston's nephew, King Louis XIV, who stayed at Chambord at least nine times, liked it. He commissioned Jules Hardouin-Mansart and his assistant, François d'Orbay, who were working on the Louvre and at **Versailles** at the time, to completely restore the chateau and "modernize" the royal apartments. From 1681 to 1685, they rebuilt vaults, finished the chapel, had the low wings toward the south covered with mansard roofs (since demolished), built stables for 300 horses (torn down in 1755), created a great esplanade to the south of the chateau, cleaned the marshes near the buildings, and dug a moat along the north facade of the manor.

Times were even happier after Louis XV gave Chambord first to his father-in-law, the exiled Polish king Stanislas Leszczynski, who lived there from 1725 to 1733, and then to Maurice de Saxe as a reward for his victory over the English. Field Marshal de Saxe, equally passionate for the hunt and theater, introduced a brilliant court life. In the nineteenth century, Chambord passed to the emperor, Napoleon, who gave it to Marshall Berthier, who passed it to the Bourbon family. They restored roofs late in the century and sold Chambord to the state in 1930. It has been under almost continuous restoration since then.

Leonardo da Vinci and the Design of the Chateau

Most records for Chambord were destroyed in the eighteenth century, and the few that survive tell more about the craftsmen who worked on the chateau than the architects who designed it. Jacques Sourdeau supervised construction in the beginning, followed by Pierre Nepveu, Jacques Coqueau, and finally Claude Sourdeau, who worked on Chambord for the longest period (1562–1584). Surviving account books list more than 1,800 workers during the years 1526–1538. Diseases were frequent because of the marshes; a report says the workers “died like flies.”

An account from 1532 records payment to Domenicque de Courtonne, described as a “maker of chateaux and a finish-carpenter,” for a wooden model (now lost) of a new chateau at Chambord. This has been taken to indicate that he prepared an early scheme for the chateau. Many historians now give Leonardo da Vinci credit as the primary designer. Documentary evidence is fragmentary, but confirms that Leonardo worked on several architectural projects for François, and several designs similar to the monumental double-spiral staircase at Chambord, unique in France, appear in his sketchbooks. He may also have been responsible for giving the chateau’s plan unprecedented (in France) regularity.

Symbolism at Chambord

Chambord retains the round corner towers and tall donjon of French Medieval fortresses. They create a picturesque silhouette that is intended, like **Pierrefonds**, to create an image of feudal power. To contemporaries, the towers and spires also evoked a utopian city, a familiar literary theme at the time. The rooftop terraces from which the women of the court could watch the hunt, or at least the hunters’ return, were the streets of a fairy-tale city of pavilions and towers covered with high, slate, conical roofs; of domed lanterns and a forest of chimneys; of domed stair towers and gabled dormers; and in the center, the lantern over the central staircase, the top of which is 170 feet above the ground and 108 feet above the terraces. This roofscape is unique in architecture.

According to Francisco de Moraes, a writer and a secretary to the Portuguese ambassador to France who visited Chambord in 1541, the triple-entry doors and the cross form of the main halls represented the verses in the Bible in which “the celestial Jerusalem is described as a cubic city with four faces entered by a triple portal” (Trézin n.d., 9).

The Layout of the “City”

The “cubic city” is in reality an immense rectangle with a single story of rooms on three sides, round corner towers, and a three-story apartment tower block on the fourth, the rear side of a courtyard, the vestige of the Medieval donjon. Four large hallways—so large that they are the major rooms of the block—form an equal-arm *Greek cross*. Originally, there were

two suites of rooms in each corner of the tower block, a rectangular apartment closest to the stairs consisting of a large bedroom and six small rooms (including dressing room, office, and oratory), and inside each of the circular corner towers a smaller apartment, which consisted of a bedroom and only four smaller rooms. Bedrooms, as the main rooms for receiving visitors, could be subdivided by tapestries. Each room had a fireplace, thus the forest of chimneys on the roof, some of which contain twelve flues. Smaller apartments for guests were arranged under the roofs. The king's first apartment probably differed from the others only in being more richly decorated, but in 1541, François had a new apartment built outside the tower block in the northeast corner tower of the chateau. It was connected to the main apartments by galleries and had a private, exterior staircase to the corner of the courtyard. Five years later, he had a chapel fit into the northwest corner tower. It was not vaulted until 1685, and the floor was not laid until the reign of Louis XV in 1742. Relatively large (100 feet long, 30 feet wide, and 50 feet high), the chapel is one of the earliest in the Renaissance style in France. Serlio, a famous Italian architect who had been invited to France in 1540 (see **Ancy-le-Franc**), may have designed the chapel.

Leonardo's Stairs

Chambord's double-spiral staircase, at the intersection of the four large hallways, has always been the main attraction of the chateau and was the largest and most elaborate staircase that had been built in France up to that time. In many respects, even if the central idea was from Leonardo da Vinci, the staircase is more French than Italian. At the time—until the seventeenth century, in fact—Italian architects thought stairs in buildings should be tucked out of sight, whereas French architects, since the end of the Middle Ages, had considered them major architectural features that showed the mastery of mason and architect. François had already (1517) had a spectacular staircase built at Blois, a major feature of that manor. Blois' staircase is exterior, however; Chambord's is the focal point of the interior.

Chambord's staircase is composed of two interlocked spiral stairs, and since the lowest steps in each spiral begin on opposite sides of the stairwell, two people starting up at the same time can see each other but never cross paths until they arrive, again on opposite sides of the stairs, on the next floor. Climbing the stairs becomes a game that, according to historic accounts, the royal children and their parents enjoyed as much as tourists today. The flights of steps are supported at the center by a hollow stone tube pierced with openings and on the outside by eight pillars decorated by a variety of Italian-inspired motifs. Neither Medieval nor Renaissance, they are characteristic of almost all the sculptural decoration in the chateau and a critical part of its charm. "Authentic" Italian Renaissance details are used only on the stairs from the court to the chapel and on those to François' corner apartment, suggesting that local sculptors only gradually came to understand (or were required to copy) Italian models.

The spectacular stairs, which continue to the roof, were largely ceremonial. Seventy-six other stairs, their variety astonishing, were more practically used to get to the maze of apartments. Some, like the stairs that connect the six levels of apartments in the central block, function just like those in a modern multistory apartment building. Hygiene was solved nearly as ingeniously. Latrines, three by three, were located under each of the major staircases and in the attics. There was another latrine on the mezzanines (intermediate floors) of the apartments and a dozen, presumably for servants, in a room near the kitchens. All these latrines emptied into a vaulted space under the chateau.

Other Entertainments

Chambord's later owners were especially fond of the theater. In 1668, Molière and his company, with music by Lully, entertained Louis XIV during a month's stay. The next year, they presented his famous *Le Bourgeois gentilhomme*, which the king disliked at the first performance but thought "excellent" at the second. These and tragedies by Corneille and Racine were given at first in a makeshift theater installed in the south hall of the central block, but by the mid-1700s, the Field Marshal de Saxe installed a more permanent theater in the north hall on the third floor. Unfortunately, it was dismantled in 1792, after the Revolution. He spent an amount equal to around 2 million of today's dollars on it, and since this sum was only for remodeling a relatively small part of the chateau, it gives an idea both of how much aristocrats spent on entertainment, and also on how much, in total, was spent on Chambord and its furnishings.

At the time Chambord was built, furnishings moved with the French court. Around 10,000 courtiers and servants, his furniture, and his tapestries moved with François I from place to place. Lodgings were requisitioned in nearby towns and villages for most of the courtiers, and although some local farmers and merchants earned money from the stays, no doubt most were very happy to see the court move on. Thus, when François (or even Louis XIV) left Chambord, it was empty. After 1700, some furniture may have remained for long periods, but the first real furniture destined expressly for the chateau was for the Marquis de Polignac in 1784. All of it was sold at auction after the Revolution; most of the furniture introduced during recent restorations is representative of the periods of the restored rooms rather than original pieces from the chateau.

Recent History of the Chateau and Restorations

Chambord has needed to be restored several times since Gaston d'Orléans and Louis XIV, partly because of poor (or nonexistent) maintenance, but also because the various kinds of chalky limestone from which Chambord was built decompose easily with moisture. Stone required to resist the greatest structural loads was stronger, thus more impervious to water, than the rest and has not had to be renewed as much. Oak floor and ceiling beams and

the roof trusses rotted from moisture leaking through the flat roof terraces, which were never really watertight. Stone vaults under the top-floor terraces also decayed. Restoration of all these parts is ongoing and will continue for decades.

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CHARTRES CATHEDRAL (NOTRE DAME), CHARTRES

Styles: High Gothic with important Romanesque and Flamboyant Gothic parts

Dates: Romanesque (crypt), 1020–1037; Late Romanesque (Royal Portal and towers), circa 1130–1170; High Gothic Cathedral, 1194–1235, consecrated 1260; Flamboyant Gothic spire, 1506–1513

Architects: Romanesque church and crypt, possibly named Berenger; Flamboyant Gothic spire, Jean Texier; other architects unknown

Chartres Cathedral, dedicated to Mary (Notre Dame), the mother of Jesus, **C**is for many the ideal Gothic cathedral. It is substantially complete—only a few spires were never built—and remarkably homogeneous in style. It has preserved more Medieval sculpture and stained glass, all of exceptional quality—about 4,000 sculptures and 5,000 personages in the stained glass—than any other church. Its double-towered silhouette still dominates the city and surrounding wheat fields, much as it did almost 800 years ago. Chartres is also one of the largest Gothic churches. Its *nave* is 53 feet wide, wider than any other French cathedral's. (For comparison, that of **Notre Dame**, Paris, is 39 feet and of Amiens Cathedral is 46 feet.) Chartres's *vaults* are 121 feet above the floor, about equal to a ten-story modern building. (Notre Dame's are 108 feet.) Chartres is 460 feet long, well over the length of a typical modern city block, and, from north to south door, the *transept* is 210 feet wide.



Dedicated to the Virgin Mary (Notre Dame) like Paris' cathedral, Chartres Cathedral, mostly built from 1194, is the most nearly complete and intact of High Gothic churches, not least because almost all of its stained-glass windows survived.

The great sculptor Rodin considered Chartres Cathedral France's Acropolis. Henry Adams wrote a famous book about it. The American Institute of Architects adopted it long ago, and has contributed significant sums to its preservation and restoration.

It is astonishing that such a small city as Chartres—its population can scarcely have been more than 15,000 in the early thirteenth century—could have built such an incredibly large and expensive building. Chartres was, however, an exceptionally wealthy town, the major city in the Beauce, the region that still produces much of France's wheat. Agricultural revenues from lands that pious parishioners had donated to the church made the corporation that built and maintained it very rich. Large numbers of pilgrims who

went to Chartres to venerate a dress they believed worn by Mary offered up vast quantities of jewels and money to the church.

Chartres's History as a Pilgrimage Center

Romans took over a Celtic city built on the site, a spur of land above the Eure River, which they renamed Autricum. Christianity was first officially recognized there around 350 c.e., and a bishop's residence and church were built near the site of the present cathedral. Roman walls under the cathedral indicate that the Christian structures replaced a Pagan cult structure. Waves of barbarian invasions that more or less completely destroyed the city were ended in a decisive battle in 911. This was followed by a period of prosperity that reached a peak during the twelfth century, when the city grew to the physical size it would remain until the nineteenth century.

Even as early as the seventh century, Mary was venerated at the site, but Chartres became one of the major pilgrimage centers in Europe after Charles the Bald, in 876 c.e., gave the cathedral a simple dress that Mary is supposed to have worn either when an angel told her she was pregnant or at the birth of Jesus, depending on the source. Because of its close association with Mary, no tombs were allowed in either the church or its *crypt*; "corruption" was to be kept away.

A Series of Disastrous Fires

Fulbert, bishop of Chartres from 1007 to 1028, and his architect (possibly named Berenger) built a much larger church to replace a Carolingian church damaged in a Viking raid in 878 and destroyed by a violent fire in 1020. They kept only a small wall from the crypt of the Carolingian church, which is still visible today. Fulbert's new cathedral, consecrated in 1037, was the largest church in France: 344 feet long and 115 feet wide. It was built at a dramatically higher level of technical skill than previous Romanesque churches, and architects of the Gothic cathedral that replaced it kept most of its lower part for the crypt of the new church. In effect, Fulbert's church determined the outline of the Gothic plan. It had two long side aisles that continued around the rounded east end of the church to give pilgrims access to three chapels that radiated from the high altar. Access to the crypt, where sick pilgrims were cared for, was west of the facade, which was located at the second *bay* of the nave of the present church. We have a very limited idea of the appearance of the upper church, which Fulbert most likely regarded as the cathedral, the crypt being the pilgrimage church; but it evidently had a wood ceiling and roof that burned and destroyed Fulbert's cathedral in a fire on June 10, 1194. Only the lower part of the west facade and the towers were left from the upper part of the church. Townspeople thought that their most precious relic, the Virgin's dress, had been incinerated, but three days later, it was found in the Carolingian crypt, where the clergy had put it for safe-keeping. This was seen as a miracle and an omen to build a more splendid church. Because the church was so wealthy, and because so many aristo-

crats—even from England—donated money, the cathedral was rebuilt very quickly in the new Gothic style that had been introduced at **Saint Denis**. The nave was finished enough for services by 1210, and the east end by 1221; transepts followed from 1230 until 1235, and the cathedral was consecrated in 1260. Two things are worth noting here: First, when there was enough money, Gothic churches could be built quickly; they did not always, as is often said, take centuries to build. Second, they were not always built from east to west, though that was the normal practice.

To build quickly, the architects used Fulbert's lower church for the new crypt and foundations, though they had to double the thickness of the walls to support the much taller and structurally more daring new church. They also retained as much of the old facade as possible. The parts of the facade that had survived were relatively recent; they replaced a facade that had been built well west of Fulbert's but which had been destroyed by fire in 1134. This new facade had towers at either end. The north tower (on the left as one enters the church) was built first, in the 1130s, and had a lead-covered wooden spire, which burned not long after construction. The south tower with its spire was built about 1142—entirely of stone. Modeled after the towers of St. Étienne in Caen (see **Abbaye aux Hommes (Men's Abbey)/St. Étienne**), it is perhaps the finest of all Romanesque towers. A series of blind arches and vertical moldings make it much lighter, visually, than the austere north tower and introduce a vertical movement, characteristic of Gothic architecture, that harmonized easily with the new church.

The Royal Portal

A wall with three doors and three tall, thin (lancet) windows above them, built between the towers about 1150, also survived the fire of 1194. Called the Royal Portal, the three doors are surrounded by some of the greatest masterpieces of Western sculpture. When they were built, the towers were not connected to the church (they served as entries to the crypt); therefore, all three doors lead into the nave. They are set behind the surface of the facade and are framed on the sides (the door jambs) by tall, thin sculptures of men and women set against tall, thin columns. The lintels above the doors, the nested rings of pointed arches that continue the lines of the jamb sculptures, and the curved, triangular areas that they frame (called *tympana*), are all covered with relief sculptures.

The columnlike jamb sculptures represent Jesus's Old Testament ancestors and predecessors: the kings and queens of Judah, prophets, and patriarchs. Except for Moses, it is no longer possible to name them. Nineteen of the original twenty-four survive; five of them have been moved into a museum and replaced by copies. The influence of St. Denis can already be seen; the sculptor of the figures on the main doors of that church probably also did the jamb figures of the right door at Chartres. The jamb figures on either side of the center door, by the so-called Master of Chartres, are even finer, however. Their faces have a calm, aristocratic elegance that has never

been surpassed. All the jamb figures have the same proportions as the columns behind them, and their cloaks fall in abstract, mostly vertical linear folds. These jamb figures are an essential part of the architecture; both they and the architecture would lose meaning if they were removed from the facade.

Every figure in Medieval art has significance, and the combination of figures usually adds several more levels of meaning. We now know only part of what the Royal Portal was meant to communicate. It is likely that the program describing what was to be represented by the sculptures was prepared in the Chartres cathedral school, which was part of the intellectual revival of the twelfth century. Bernard, chancellor of the school from about 1119 to 1124, and his brother, Thierry, internationally known for his book on the Seven Liberal Arts (the *Heptateuchon*), made important attempts to reconcile the writings of Plato and Aristotle with the Bible; these concerns can be seen in the Royal Portal.

It is this reconciliation rather than the Last Judgment, the conventional sculptural scheme for west facades of Romanesque and Gothic churches, that is the subject of the sculpture above the doors of the Royal Portal. Instead of graphic representations of the souls of the dead being sent to heaven or—especially vividly—to hell, angels raise Jesus to heaven in the tympanum of the left (“ascension”) portal. They are surrounded by the signs of the zodiac (symbols of heaven) and figures doing seasonal work associated with those signs. Christ sits majestically in an oval halo (a mandorla) surrounded by symbols of the Four Evangelists in the center tympanum. He is perhaps sitting in judgment, but there are no depictions of suffering or ecstatic souls. The tympanum over the right door is devoted to the birth and childhood of Jesus centered around a majestic figure of Mary, as Queen of Heaven, sitting on a throne with baby Jesus on her lap. On the arch rings around them are symbols of the Seven Liberal Arts and the personages from antiquity associated with them: geometry and Euclid, rhetoric and Cicero, dialectic and Aristotle, arithmetic and Boethius, astronomy and Ptolemy, music and Pythagoras, and grammar and either Donatus or Priscian. Taken together, the sculptures almost certainly argue that Jesus showed us that we must balance the active life (work) with the intellectual life (study), and the church with the university. The three windows above the doors are of the same period and quality as the sculptures. They represent, on the left, Christ’s ancestors (the Tree of Jesse); in the center, Christ’s youth; and on the right, Christ’s death.

The New, Gothic Church

When the architects rebuilt Fulbert’s church, they added four new chapels around the *apse* between the old ones and two transepts to the north and south that transformed the plan into a *Latin Cross* (a cross with a long upright and two short arms—the transepts). Like the nave of Fulbert’s church, the new nave had only a single aisle on each side that continued around the choir, where the architects added a second aisle. Since the nave was used as a hostel during pilgrimages—only the choir (the rectangular portion for the

clergy between the transept and apse), apse, and chapels were sacred—the floor sloped toward the western doors so that it could be washed down in the mornings. A labyrinth design was laid in the center of the nave floor, so that worshipers could take a symbolic pilgrimage on their knees. Unlike the labyrinth at **Reims** or Amiens cathedrals, the names of Chartres's architects were not included in it; they unfortunately have been lost.

Innovations in the Architecture

These now-anonymous architects introduced several new things that were much copied. They decided to make the bays regular and to use the relatively new idea of stone rib-and-panel vaulting to replace the wooden ceilings that had caught fire and destroyed Fulbert's church. In previous churches using the rib-and-panel system, a unit of vaulting covered two bays (see Abbaye aux Hommes (Men's Abbey)/St. Étienne) with six-part (sexpartite) vaulting. Ribs connected pairs of columns across the nave, but the diagonal ribs extended across two bays creating six separate vaults. At Chartres, however, the diagonal ribs form an 'X' in *each* bay, creating a four-part (quadripartite) unit. With sexpartite vaulting, "strong" piers or columns typically alternated with "weak" columns, corresponding to whether two or three ribs came down on them. By using quadripartite vaulting, Chartres's architects could give every column the same form, though to add interest, they alternated octagonal piers with attached, smaller round columns and round piers with attached, smaller octagonal columns. The difference is one of the many engaging subtleties at Chartres.

Flying buttresses, arches that "fly" from the tops of the outside walls to large piers standing well away from the building, were used from the beginning at Chartres. Earlier churches, such as Notre Dame in Paris, which were originally built without them, required deep galleries, upper levels as deep as the side aisles, for stability. Though these galleries could be used for overflow crowds to *bear* a service, nothing on the ground floor is visible from them. Chartres's architects replaced them with a low (10-foot high), narrow, arched passageway (*triforium*) built into the wall at the level of the sloping roofs over the side aisles. It consequently has no windows, but creates a layer of space that visually lightens the interior; and the passage is useful for maintenance. In combination, the flying buttresses and elimination of the deep galleries allowed the architect to make the windows on the top (*clerestory*) level of the church as tall as the arches in the ground-floor arcade (46 feet).

The Flying Buttresses

Chartres's flying buttresses are unique; there are three levels of them along the nave. Small columns arranged like the spokes of a wheel connect the lower two arches, which bridge between the midpoint of the clerestory windows and the buttresses that rise from outside the side aisles. A third flyer, obviously added later, arches from the freestanding top of the buttresses to just below the gutter. On the choir, which was built after the nave, the upper flyers were planned from the start; there, the middle flyer continues past the

first pier-buttress to a second, lower one. Not only does this make better sense structurally, it also adds greatly to the lacy, “dematerializing” effect of the buttresses on the choir and apse.

The Stained Glass

Chartres’s thirteenth-century stained glass is unsurpassed in quantity and quality. Of the original 183 windows, 145 still exist. Most were created as the church was built, between 1200 and 1235. Many different artists contributed, and there is consequently a variety of styles. Scenes from the Bible are mixed with scenes of everyday life, particularly the lives of the groups—such as bakers or bankers—that paid for the windows. They are a Medieval encyclopedia as well as an illustrated Bible. Weathering and air pollution have darkened the glass over the centuries, making the interior of the cathedral so dark that it takes ten minutes or more for one’s eyes to adjust upon entering. This was not the intention, and the three lancets of the west facade, which were cleaned and restored in the 1980s, show how brilliant the glass originally was. All three rose windows are spectacular. Blanche of Castile, granddaughter of Eleanor of Aquitaine, paid for the rose in the north transept.

Towers, Spires, and Transepts

Had all the towers and spires planned for Chartres been built, it would look dramatically different. There were to be towers with spires flanking the entry porches of the north and south transepts, two more next to the choir, and almost certainly a spire over the crossing of the transepts and nave. All these spires were given up, and only the bases of the transept towers were built.

All the sculptures on the transept porches were, however, completed. Their importance as examples of High Gothic sculpture is as great as those of the Royal Portal are of Late Romanesque, and they demonstrate how attitudes toward sculpture had changed during the seventy years or so since the construction of the Royal Portal. Jamb sculptures on the west facade are part of the architecture, tied physically and proportionally to the columns behind them. Sculptures of humans on the transept porches are independent of the architecture; they have more realistic proportions, and their faces are more like portraits of real humans.

Later Modifications and Additions

A sacristy was added to the church at the end of the thirteenth century, and a chapter house surmounted by a chapel dedicated to St. Piat was added to the east end from 1323 to 1335. In 1506, lightning struck the north tower of the west facade, and the lead-covered wood spire burned—again. A local architect, Jean Texier (also called Jehan de Beauce), added a floor to the tower and a stunning, fantastic stone spire in the florid *Flamboyant* style (finished 1513). It is a complete contrast to the Romanesque south spire. Symmetry was not terribly important to Medieval architects, who appreciated a dynamic balance of contrasting elements. Another fire, started by a careless worker on June 4,

1836, destroyed the wooden trusses and roof over the vaults. It was replaced by one of the first major iron structures in France.

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CHATEAU MAISONS-LAFFITTE. *See* Maisons: Chateau.

CHENONCEAUX: CHATEAU, LOIRE VALLEY

Styles: Late Medieval and Early Renaissance

Dates: 1514–1522 (original chateau); 1556–1559 (bridge); 1570–1576 (galleries on bridge); 1580–1585 (commons)

Architects: Philibert Delorme (or de l'Orme), Jean Bullant, and
Unknown Masters

One of the prettiest of the Renaissance manors in the Loire Valley and the favorite of many, if not most, visitors, Chenonceaux was built in four stages. Two famous women are closely associated with the chateau (manor), and they are at least partially responsible for the delicacy and imaginative quality of Chenonceaux.

A Mistress, a Queen, and Four Stages of Construction

Chenonceaux, originally written without the terminal “x,” belonged to the Marques family from 1230 until it was bought in 1513 by Thomas Bohier. The first Marques chateau was demolished as punishment for opposing Charles VII (and Joan of Arc). His son changed sides and rebuilt the chateau. Only the *donjon* (keep or fortress tower) remains: the isolated, freestanding, round tower on the right when facing the chateau. When the new owner, Thomas Bohier, Receiver-General of Normandy, built a new manor, he used the foundations of a mill on the river next to the old chateau, not those of the chateau itself, as would have been customary at the time. Bohier’s manor was, therefore, not built next to the Cher River, a tributary of the more famous Loire River, it was built *in* the river. Construction began in 1514, and was largely finished by 1522. Bohier died two years later, his wife in 1528. Because the Bohier family had been implicated in the same scandal as the Berthollets, who built the nearby chateau Azay-le-Rideau, their chateau became the property of the King François (Francis) I. His son, King Henri II, inherited it and gave it to his mistress, Diane de Poitiers. Henri’s wife, Catherine de Medici, was not amused. Knowing the queen’s animosity, the king arranged for Diane to own Chenonceaux outright through a fictive “sale.” Diane added a garden, which has been restored, and connected the chateau with the opposite bank of the river with a stone bridge. The great Renaissance architect Philibert Delorme (1556–1559), who also built Diane’s exquisite chateau of *Anet* near Paris, was the architect. When Henri II died, Catherine could not confiscate Chenonceaux, which Diane owned, but she did force Diane to trade it for the nearby, much larger but less delightful chateau of Chaumont.

Catherine built two stories of galleries for entertaining on the bridge that Diane had commissioned; remodeled the north (entry) facade; added rooms between the chapel and library, which extend out from the east side of the main block; and built a service wing on the west side of the entry courtyard. She also began the foundations (which still exist) for a building at the end of the galleries, on the bank of the Cher. She intended even more construction. If the plans, which were published in J. Androuet du Cerceau’s famous book, *Les plus excellents bastiments de France* (1576–1579), had been carried out, the present chateau would have been merely the kernel of an immense manor arranged like pincers around the existing buildings.

Catherine’s widowed daughter-in-law, Louise de Lorraine, inherited both enormous debts and the chateau, in which she lived as a recluse. Nothing more was built, and after Louise’s death, Chenonceaux was abandoned for more than a century. A local priest saved it from destruction by locals during the Revolution. Chenonceaux then passed through several hands, most notably those of Mme. Pelouze, who commissioned the architect Félix Roguet to restore it. He removed several of Catherine de Medici’s additions to the exterior and almost completely renewed the interior. The Germans

bombed Chenonceaux in June 1940. Occupied by them, it was bombed anew by the Allies on June 7, 1944, at which time the chapel was damaged, its windows destroyed.

The Architectural Character

From the east, Chenonceaux, with its picturesque silhouette of spires, pinnacles, small towers, and chimneys, looks like something out of a Medieval miniature—a last, flamboyant example of the Gothic spirit. The regularity of the plan and the interior stairs were quite modern for the period and indicated the beginnings of Italian Renaissance influence in French architecture. As at **Chambord** or Azay-le-Rideau, two nearby chateaux that are also transitional buildings, Chenonceaux is a mixture of the Medieval and Renaissance. The original builder retained several defensive features from the Medieval castle, such as the balconies over the entrance and *machicolations* (projections that supported a walkway for guards). By this time, features that had been kept from the old castle, such as the donjon, were symbols of the antiquity of the site and the high social station of the inhabitants. (Only nobles were permitted to build castles in the Middle Ages.) In any case, these features add much interest to the chateau and help to create a dynamic balance in the asymmetrical entry facade.

Chenonceaux's plan, like its silhouette, is similar to Chambord's, at least with respect to their residential blocks. Both are square, with round towers on the four corners. At Chenonceaux, however, there is only a single, wide hall from front to back, whereas at Chambord, two halls intersect in a cross. Chambord's famous stairs are at the intersection of the halls, but Chenonceaux's main staircase is located halfway down the central hall to the west. While not as spectacular as Chambord's double-helix stairs, Chenonceaux's staircase is historically significant and interesting. It is partially circular instead of rectangular. This shape permits it to be held away from the outer wall and a short corridor to be inserted against the exterior wall to connect the two rooms on either side of the stairs. Conventionally, there would have been a landing in its place, on which one could rest or look outside. Chenonceaux's plan as originally built, with the front door opening directly on a hall that looks out on water at its other end, is extremely rare in France, but rather typical of Venetian palaces. This may be a coincidence, but some historians think that Thomas Bohier, who had lived in northern Italy, may have been inspired by these palaces. It is also possible that one of the several famous Italian architects that lived nearby at Amboise (Fra Giocondo, a Venetian; Domenico da Cortona; or Leonardo da Vinci) may have been consulted, but there is no documentary evidence that they were.

Thomas Bohier intended his chateau to be a place from which to look out on the river on three sides. Philibert Delorme's extension to the south, the bridge built for a ballroom, changed this concept. Only the bridge was built while Diane de Poitiers lived at Chenonceaux. Curiously, it is not on the axis of the main hallway as one would expect, but to the west. It is not certain

who Catherine de Medici's architect was for building the double-level gallery on Delorme's bridge, but it was probably Jean Bullant rather than the obscure Denis Courtin, who is sometimes given credit. Bullant had created a similar double gallery elsewhere and had become architect to the queen mother in 1570. In any case, the facades of the galleries are dramatically different in style from Bohier's chateau. They have many characteristics of the style, usually called Mannerist, that was fashionable in mid-sixteenth-century Italy, demonstrating the continuing and increasing influence of Italian architecture in contemporary France.

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CHURCH OF SAINT MARY MAGDALEN, PARIS. *See Madeleine.*

EIFFEL TOWER, PARIS

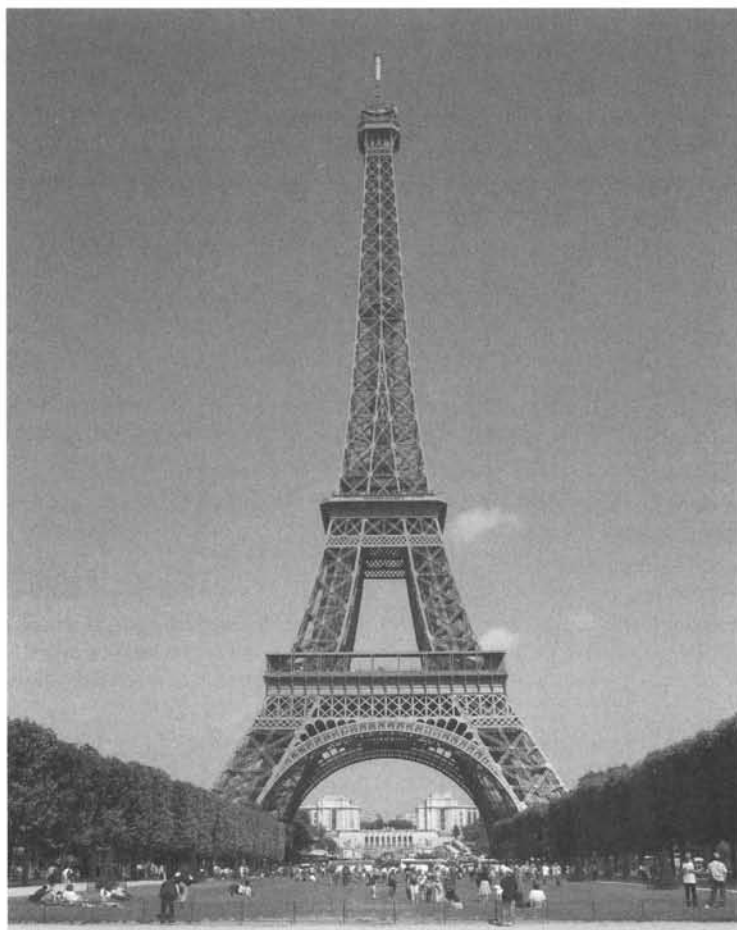
Style: Modern

Date: 1889

Architects: Designers and engineers, Emile Nouguier and Maurice Koechlin; architect of record, Stephen Sauvestre

Gustave Eiffel (1832–1923) proposed a “Three-hundred-meter-high (1,000-foot) Tower” (as it was originally called) as a temporary attraction for the 1889 Paris World’s Fair that commemorated the hundredth anniversary of the French Revolution. It was immediately closely identified with Eiffel, the head of the construction company that built it, and is now universally known as the Eiffel Tower. More than any other monument, it is the symbol of Paris.

Eiffel’s construction company, one of the largest in France, had built the railroad station in Pest, Hungary, and the ingenious iron frame of the Statue



Emile Nouguier and Maurice Koechlin, two engineers in the Eiffel Company, designed the Eiffel Tower: Paris' most recognizable symbol. They applied bridge technology to create the "300 meter (almost 1,000 feet) tower" as the symbol of the 1889 World's Fair. Despite initial reservations of a few, the tower was an immediate and spectacular success.

of Liberty (inaugurated in 1886), but it was known largely for spectacular railroad bridges such as the Viaduc de Garabit (1884) in central France and the similar bridge in Porto, Portugal. Experience gained from building these bridges was critical in designing structural members that could withstand the winds that blow a thousand feet above the ground. In fact, the latticed girders that form the legs of the Eiffel Tower are modifications of the pylons of these bridges.

A precedent for revolutionary metal structures at world's fairs had been set by the very first one, the Great Exposition of 1851 in London. A single,

revolutionary iron-and-glass structure, the Crystal Palace, which had been constructed to house the entire exposition, captivated visitors. They were accustomed to heavy structures of stone, brick, and wood, but the Crystal Palace was built entirely with incredibly thin iron columns and delicate iron trusses. Its walls and roof were mostly of clear glass panels (the lower wall panels were of plywood to control light on the exhibits). To visitors, the Crystal Palace was as enchanting as a fairy palace of soap bubbles. Covering about 19 acres, it was among the largest buildings constructed up to that time—its central nave was as wide as St. Peter's Basilica in Rome and several times as long. Unlike St. Peter's and buildings of comparable size that had taken many years to construct, the Crystal Palace had been built in an astonishing thirty-nine weeks. For the next several decades, therefore, iron (and eventually steel) structures of increasing audacity were essential features of world's fairs. Four years after the Crystal Palace Exposition, the French had responded with an iron-and-glass "Palace of Industry" that dwarfed the Crystal Palace in size, and for the 1867 World's Fair, they created an even larger structure. Grander yet was the main exposition structure built for the Paris fair in 1878. World's fairs continued to grow in size and complexity, so that one building was no longer practical to accommodate all the exhibitors. By itself, the Gallery of Machines at the 1889 World's Fair in Paris was significantly larger than all previous buildings of any kind. Eiffel knew that only something quite spectacularly different could compete with the other fair buildings for attention, thus his proposal for a 300-meter tower. The idea was not entirely novel, however.

An iron "thousand-foot tower" had first been advanced by an Englishman (Trevithick) in 1833, though he died shortly after his proposal was made, and it is doubtful, given the technology of the time, that the tower could have been built. Even more unrealistic was the thousand-foot tower suggested for reusing the prefabricated parts of the 1851 Crystal Palace. Two American engineers, Clarke and Reeves, proposed a thousand-foot tower for the 1876 World's Fair in Philadelphia. Their delicate iron trellis in the form of a slightly truncated cone, which was to represent the progress that science and technology (and the United States) had made over the cultures of older nations, could have been built, but not enough investors could be found. Clarke and Reeves's scheme was, however, published in France. Not only was the idea for a thousand-foot tower not original with Eiffel or his office, his was not the only proposal for a tower for the fair.

In fact, it was not even Eiffel who originated the idea for the "Eiffel Tower." His office manager, Emile Nouguier, and the engineer Maurice Koechlin made the first sketches and calculations that were given physical form by the company architect, Stephen Sauvestre. Sauvestre designed the masonry bases of the tower; added the great arches (which are decorative, not structural) that connected its legs; proposed a bulbous, glazed finial; and added various other decorations that he thought would make the tower more attractive to the public—and to Eiffel.

Now interested in Koechlin and Nouguier's project, Eiffel applied for a patent in their three names, shortly thereafter buying out his collaborators. He next began a campaign to have "his" tower built by exhibiting drawings for it and publishing them, in 1884, in a prestigious engineering magazine. According to Eiffel's calculations, the tower would weigh 6,500 metric tons and could be built for 3,155,000 francs. (In fact, the completed tower weighed 7,300 tons and cost two and a half times the estimate.) He also argued that scientists could carry out numerous experiments in physics, meteorology, astronomy, and telegraphy atop the tower. Eiffel clinched his argument with an appeal to patriotism: "The tower would seem to be a worthy representation of the art of the modern engineer as well as the century of science and industry in which we live, prepared for by both the great scientific movement of the eighteenth century and the [French] Revolution of 1789, to which this monument will serve as witness."

Eiffel outmaneuvered several other architects' and engineers' projects for a monumental symbol of the fair and countered several reservations of the fair's organizers, particularly with respect to lightning protection and elevators. He also convinced them that of the several sites proposed for the tower, the one next to the Seine River, in the center of the fair, was the most feasible. Eiffel himself financed nearly half the estimated cost of the tower and raised the rest through a government subsidy and a group of investors, all of whom were paid back within a year.

Much of the decoration that Sauvestre had proposed was eliminated as an economy measure—a double economy, since the reduction in decoration made the tower much lighter. The simplification also improved the tower aesthetically. Erection was impressively rapid. By preassembling sections of the tower in his factory in a Paris suburb, the tower was built in only twenty-four months with, surprisingly, only a single fatal accident.

Statistics for the tower are equally impressive. It was built with 18,000 pieces of iron connected by no less than 2,500,000 rivets. Because the weight of the tower is spread over thick, broad concrete foundations, it exerts no more pressure at any point than an individual sitting on a chair. Visitors can mount the tower either by stairs—there are 360 steps to the first level and 1,062 more to the second level—or elevators (supplied by the American firm Otis and the French firm Roux-Combaluzier and Lepape). Except for services, access to the top of the tower is by elevator only, supplied by the French firm Edoux. These elevators, the lower ones having to follow the curved shape of the legs, were of unprecedented runs and were considered nearly as much a tour de force as the tower itself. Indeed, the main objection expressed in a major architectural magazine when the tower was announced, was that it would be "impossible to house [elevators] in the curvilinear pillars."

Finished on March 31, 1889, and opened to the public on May 15, the Eiffel Tower engendered a curious sort of controversy. Famous artists and writers, among them Guy de Maupassant, Charles Garnier (architect of the

Paris Opera), and Alexandre Dumas fils, railed against the “useless and monstrous Eiffel Tower.” To many of them, the tower was an undisguised expression of the structure of a building and represented the division between architect and engineer, between art and science, that had been developing for nearly a century. Eiffel’s tower was instantly popular, however, with the public—including Thomas Edison. Nearly two million visitors paid to ascend it during the 173 days of the fair. Tastes, however, changed; there were only a fifth as many visitors the next year, and only 150,000 in 1899, ten years after the fair.

A 1903 study considered proposals for demolishing the tower. Eiffel, who had turned his attentions to scientific experiments after his reputation was nearly destroyed in 1893 by being implicated in a Panama Canal fiasco, stressed the value of the tower for science, a use he had proposed from the beginning. Numerous physics and meteorological experiments, in fact, contributed to decisions to preserve the tower as a tourist attraction. By the mid-1920s, artists had completely changed their attitudes and made the Eiffel Tower the subject of many paintings, movies, and songs. It was the tower’s adaptation first as a radio and then as a television antenna, however, that assured its survival. Only in 1963 did the number of visitors equal those in the first year of its existence. By 1989, its hundredth anniversary, the Eiffel Tower received nearly five million visitors—few of them Parisians. From 1982 through 1985, the Eiffel Tower was completely restored.

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FONTAINEBLEAU: PALACE, FONTAINEBLEAU, 30 MILES SOUTHEAST OF PARIS

Styles: French Renaissance and Neoclassical

Dates: 1528–1814

Architects: Giles Le Breton (d. 1553), Francesco Primaticcio (1504/05–1570), Philibert Delorme (1500/15–1570), Jean Du Cerceau (circa 1545–1590), Angès-Jacques Gabriel (1698–1782), and others

Originally a fortified Medieval hunting lodge in the forest southeast of Paris, the royal palace of Fontainebleau is a charming, picturesque building important in the development of French Renaissance architecture. Its interiors were decorated by some of the finest artists of the time. It is also an architectural jumble of pieces from many different periods. King François I, who commissioned the rebuilding of a castle on the site, is partly responsible for this “improvised” character, since he had insisted on keeping the *donjon* (the fortified residential tower) from the old castle and had his builders add the new parts onto it.

François had been responsible, almost single-handedly, for importing the new Italian Renaissance style of architecture into France when he hired architects and artists from Italy—including Leonardo da Vinci—to advise local artists, architects, and builders (see **Chambord**, and **Chenonceaux**). Fontainebleau represents a new direction, however. It was built after François returned from captivity in Spain and had moved his capital from the Loire Valley to Paris. Its builders had time to assimilate most aspects of the new style. Despite the awkwardness of how the pieces fit together, the individual parts of the palace are less complex in form and decoration than the earlier Loire Valley chateaux and have a simplicity that leads directly to the classicism of the next generation of French architects, for example, Lescot at the **Louvre** in Paris. At the same time, they are more “French” than the contemporary **Ancy-le-Franc** by the Italian architect Serlio, even though he advised the king at Fontainebleau.

Fontainebleau in the Reign of François I

Giles Le Breton is generally credited with being the designer as well as builder of the first round of construction. First, he added the *Porte Dorée* (1528) onto the *donjon*. Overall, it is still a French Medieval fortified gate



Fontainebleau (1528–1814) was a palace for kings and emperors from François I to Napoleon, each of whom added sections. It documents, therefore, French architectural styles from Renaissance to Neoclassical. Several important painters, including Primaticcio and Rosso Fiorentino, contributed to its decoration.

with its high-pitched roofs, its vertical interlocking of windows, and its generally vertical proportions, but Le Breton gave it a Renaissance appearance by superimposing a mathematically regular ordering system and by borrowing details from contemporary Italian practice (for example, *pediments* and the three superimposed balconies).

From 1528 to 1540, he added a large service court to the west of the Port Dorée. Originally called the Basse (Low or Service) Court, it was soon used for parades and tournaments because of its size and, renamed the Cour du Cheval Blanc (Court of the White Horse) when King Charles IX placed in it a copy of the equestrian statue of Marcus Aurelius, it eventually became the entry court for the palace. The court's north facade is both simpler and more residential in style than the Porte Dorée. Le Breton composed it as a long, horizontal block punctuated with five tall pavilions, but it is far from strictly symmetrical. Le Breton's work is primarily constructed of rubble masonry, stuccoed and painted white, because the local stone is difficult to carve into regular blocks. Windows and doors are framed with brick and small pieces of stone, and floor levels are differentiated with brick moldings. As with the Porte Dorée, the roofs are steep and slate-covered. Probably the most famous and imitated part of the palace, the horseshoe-shaped staircase at the center rear of the courtyard, is not by Le Breton, but was designed much later by Jean du Cerceau during the reign of Louis XIII. Members of the court used it as a viewing stand during ceremonies and festivals.

Le Breton used foundations of the old castle as much as possible for the royal apartments to the east of the donjon, which gave the new wing an irregular, roughly oval shape, thus its name, "The Oval Courtyard." It has been remodeled several times and on the exterior, at least, has little architectural interest. He also connected it with the Cour du Cheval Blanc by a gallery, which was decorated by some of the most important Italian artists François had hired, chief among them Rosso Fiorentino, heavily influenced by Michelangelo, and Francesco Primaticcio, a student of Giulio Romano. Usually called the Gallery François I, it is an important example of Italian Mannerism and the definitive collection of paintings of "The First Fontainebleau School." François hung Leonardo da Vinci's *Mona Lisa* in his bathing suite in this section. Originally a sort of enclosed bridge between the two sections of the palace, the gallery was doubled in width under Louis XVI (1786), so that light now comes in only from one side. The ballroom (Salle de Bal), 100 feet long and 30 feet wide, is the other famous room of the palace. Finished under François' son, Henri II, by Philibert Delorme with frescoes by Primaticcio and Nicolo dell'Abate, it has recently been meticulously restored.

Fontainebleau from the Reign of Henri II to the French Revolution

King Henri II's monogram, an H (for Henri) intertwined with C (for his wife, Catherine de Medici), can be seen all over the parts he added or had decorated, though the Cs superimposed on an H could also be interpreted as Ds (for his mistress, Diane de Poitiers). Catherine was justifiably jealous,

and when Henri was killed during a tournament, she replaced Diane's favorite architect, Philibert Delorme, with her fellow Italian, Primaticcio. She also hired Nicolo dell'Abate to create brighter colored paintings. (For more on Diane and Delorme, see the **Chenonceaux** and **Anet**.)

King Henri IV was very fond of Fontainebleau and considerably expanded it. He had the Oval Courtyard remodeled in a more regular shape, and a service wing and a handball court built further to the east. Most of the painters he commissioned to decorate the new constructions were from Paris and, less influenced by Italian than Flemish painting, created a new "Second Fontainebleau School." From the reign of Louis XIV until the Revolution, other than redecoration of the royal apartments, the most important addition was Angès-Jacques Gabriel's new east wing of the Cour du Cheval Blanc for Louis XVI.

After the Revolution

Aside from losing most of its furniture, Fontainebleau suffered relatively little during the French Revolution, after which Napoleon stayed there frequently, preferring Fontainebleau to Versailles and calling it the "House of the Centuries," probably because it was less closely connected to his "rival," Louis XIV. He had the Renaissance wing that closed off the Cour du Cheval Blanc demolished and replaced by a grille whose gilded eagles are reminders that the emperor bade farewell to France from the Horseshoe Staircase at the rear of the courtyard when he was taken off into exile in 1814. His admirers renamed it the "Adieu Courtyard."

Landscaping at Fontainebleau

The courtyard to the east of the Cour du Cheval Blanc, the Cour de la Fontaine (Fountain Court) opens onto the Carp Pond; light meals were served in a pavilion on an island in the middle of it, even during the time of Napoleon. To the south of the palace are the "English Gardens," which, like the Garden of Diana to the north, were refashioned in the English Picturesque style in the early nineteenth century. In their midst is the fountain, called Bilaud or Blaut, probably named for an earlier owner of the property, to which the name Fontainebleau refers. Andre Le Notre refashioned the formal gardens to the southeast and east of the palace, where Henri IV had already introduced a canal that anticipates the ones Le Notre designed for Versailles and Vaux-le-Vicomte.

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FONTENAY ABBEY, EGREVIES VALLEY, BURGUNDY

Style: Cistercian Romanesque

Dates: 1139–1147

Architect: Unknown

“Cistercian architecture was decorated by plain-song. And its soul was to be found in prayer.” (Bazin and Pascal 1987, 3)

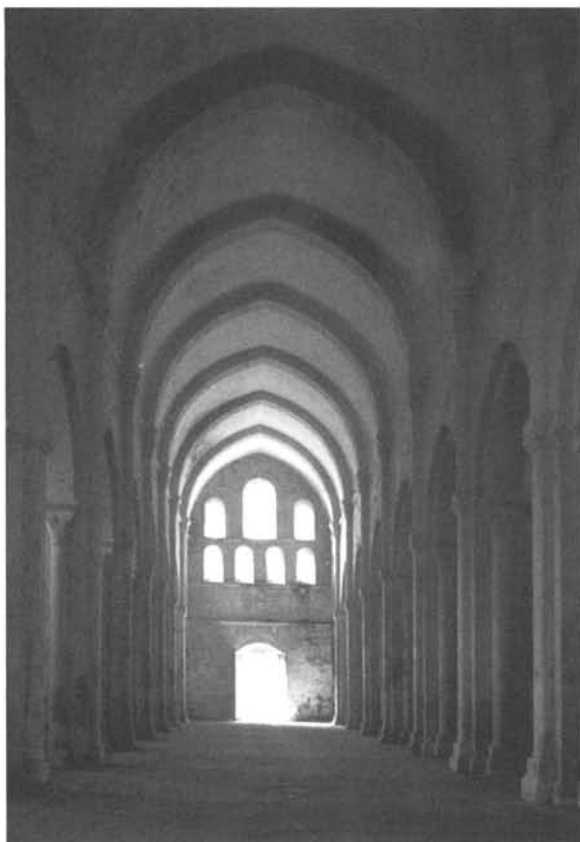
Medieval Monasticism at Its Purest

Fontenay Abbey is the oldest and best-preserved monastery of the Cistercian Order, which supplanted Cluny as the most influential religious order in the Middle Ages. Fontenay represented Medieval monastic architecture at its purest and became a model for many other monasteries across Europe. Not only are Fontenay’s buildings exceptionally well-preserved, but also its surroundings, farms and forests in the Egrevies Valley on the edge of Burgundy, have changed relatively little since the Middle Ages.

A monk named Robert founded the Cistercian Order when, in 1098, he established a monastery 15 miles south of Dijon at Cîteaux—Cistercium in Latin, thus the name of the Order. Robert was succeeded, first by the Abbot Albéric and then by the English Abbot Stephen Harding, a very religious mn, who defined the rigid rules that governed the Cistercians. It was, however, Bernard of Clairvaux (1090–1153) who joined the monastery at the age of twenty-two and devised the typical Cistercian monastery plan that was used for Fontenay. It was because of Bernard that the Cistercians exercised widespread influence on both Medieval society and architecture.

Bernard of Clairvaux and the Founding of Fontenay

In 1115, twenty-five years old and not yet a priest, Bernard left Cîteaux with several friends and founded a daughter house, dependent on the mother monastery, at Clairvaux, 50 miles north of Dijon. As abbot of Clairvaux, he became the confidant of five popes and advisor to King Louis VII of France. A charismatic leader—he founded sixty-eight monasteries—Bernard established a regime of purity and hard work that attracted many to the order. By the time he died, there were 343 Cistercian monasteries; ultimately, there were 742, including Vistic in Lithuania. On October 29, 1118, Bernard and thirteen monks from Clairvaux founded Fontenay, which most directly reflected Bernard’s beliefs.



Fontenay Abbey (1139–1147) is one of the best preserved Medieval monasteries in France, an outstanding example of Cistercian Romanesque architecture.

Conditions for Cistercian Monasteries: Purity and Austerity

Bernard established several conditions for all Cistercian monasteries. The founding abbot was required to visit each monastery he founded at least once a year to make certain that it was strictly following the Benedictine Rule. In contrast to the Cluniac system, in which all monasteries were subject to the mother monastery at Cluny, Cistercian monasteries were subject only to the next higher one in the Order's hierarchy (usually the one from which the founding abbot came), which gave them a higher degree of autonomy. As important as these conditions were, it was Bernard's forbidding of all decoration that most distinguished Cistercian monasteries from those of all the other orders. He believed that Cluny's wealth and power had made it decadent, and that this was evident in their richly decorated mother church: "the walls of the church glitter, but there is nothing for the poor;

the stones of the church are gilt, but children are naked.” Three years before Bernard’s death, the General Chapter proclaimed: “We forbid carvings or paintings in our churches and elsewhere in the monastery because, when one looks at them, one often forgets the usefulness of deep meditation and the discipline of religious severity” (all quotations in this entry are from Bazin and Pascal 1987). Not surprisingly, Bernard of Clairvaux did not get along well with Abbot Suger, the powerful prelate who had created an especially splendid church, the first Gothic church, at **Saint Denis**. Cistercian churches were, therefore, relatively austere; not only were there no sculptural decorations, but also an edict of 1182 required that any colored glass in monasteries be removed within three years. Manuscripts created or used by the monks had no illustrations.

The Cistercian “Style”

Despite the conditions Bernard imposed on monastic discipline, there is no evidence that either he or his successors ever imposed a plan or style of architecture on Cistercian monasteries. Nevertheless, they were relatively uniform in style whether in Britain, Scandinavia, Poland, Central Europe, Spain, or Italy. It is likely that overseers moved from building site to building site to aid the monks who, to the extent practical, designed and built the monasteries themselves. Churches were unpretentious in size and proportions. All stone towers, even bell towers, were considered symbols of vanity and were officially forbidden in 1157, as were crypts under the churches. With few, mostly late, exceptions, Cistercian churches were angular and even had rectangular ends to the *nave* and chapels instead of the more conventional rounded *apses*.

Bernard’s description of God, in addition to his reaction against Cluny and Suger, helps to explain his architectural principles. “What is God?” he asked. “He is length, width, height, and depth.” For him, that meant that the physical sizes, shapes, and proportions of spaces in a monastery had a religious significance in addition to their being supremely functional places for the monks to pray and work. “Simple” and “direct” are better descriptive terms than “austere,” which is frequently used to describe Cistercian architecture. “Austere” implies something cold and forbidding, but Cistercian architecture, as Kenneth Conant wrote, is like a lily: extremely simple, but very lovely.

As to specific shapes and details, a simplified version of “Burgundian half-Gothic,” the dominant local style, was adapted at Fontenay. Still essentially *Romanesque*, this architectural approach has some characteristics, most notably the pointed arch, that characterized the emerging *Gothic* style of architecture. (Both styles are discussed in the entry for Saint Denis.) Several excellent architects emerged from within the Cistercian Order at its beginning, including Gérard, Bernard’s brother; Geoffroi d’Ainai; and Achard. It is not known if any of these was involved in the design of Fontenay, but Fontenay’s architect must have been both experienced and talented, given the

high quality of the monastery's construction and the sensitivity to proportion and detail exhibited.

Fontenay, like other Cistercian monasteries, was located in what the French call a "desert," a wilderness area remote from centers of civilization, a factor that saved many of them from destruction after the French Revolution. These sites were chosen because there were good sources of water, wood, and stone for building so that the monastery could be nearly self-sufficient. Specialized craftsmen were brought in only if necessary, but there were living and dining facilities for lay brothers (as many as 300 in the larger monasteries), members of the monastery who did not take the full orders and on whom the monks depended for much of the manual labor. The general public was not encouraged to visit Cistercian monasteries.

The Beginnings of Fontenay

Fontenay's first site proved less desirable than one nearby, and twelve years after its founding, the abbey was moved to its present location. "Spiritus Dei ferebatur super aquas" is inscribed above the abbey gate: "The spirit of God hovers above the water here," thus the name Fontenay (Fontanetum in Latin), which refers to the springs or fountains at the site. A small church dedicated to St. Paul (demolished in the sixteenth century) was built first, then the *cloister*, the *chapter house*, and the monks' dormitory. A permanent monastic church was not begun until 1139, and construction lasted until 1147, when the church was consecrated by Pope Eugene III, who had been a monk at Clairvaux. Immensely rich, Ebrard, the English Bishop of Norwich who retired to Fontenay in 1139, paid for much of the building.

Description of Fontenay's Plan

Fontenay's plan was not innovative; except for its unadorned simplicity, it differed little from the typical monastic plan of the period. (Cistercian plans varied only with differing site conditions.) The abbey church was oriented east-west, with the main altar in the east end. In contrast to a parish church or cathedral, which was typically entered at the west end, the most important entrances to the monastic church were from the monks' dormitory (for night services) and from the cloister (for services during the day). Since the public was not encouraged to come to Cistercian monasteries, the western entrance to the church, used mostly by the lay brothers, was very plain. Fontenay's is especially plain, since the porch that protected the western door is gone.

Since all parts of the monastery were accessible from it, the cloister was the center of activity of a monastery and located to the south of the church to assure a maximum amount of sun. Almost, but not quite square in plan—117 feet by 124 feet—Fontenay's cloister is much simpler than those of other

orders. In most Medieval cloisters, column capitals were richly carved with personages, animals, and elaborated foliage, each one different, but the only decorations on the capitals in Fontenay's cloister are simple, flattened leaf shapes. Nonetheless, the unadorned cloister, like its church, is beautiful, with subtle variations throughout. As apparently simple as it is, the cloister at Fontenay is more refined than in many other Cistercian monasteries (such as Senanque or Le Thoronet). A fountain was provided in the center of the north side of the cloister, opposite the refectory but next to the church, for washing hands—the only body part that Cistercian monks washed; it was demolished in the nineteenth century. On the exterior of the west side of the cloister was originally a large building, probably for the lay brothers. It apparently opened directly into the church, but was replaced by the abbots' residence in the seventeenth century.

The sacristy and an archival storage room were located on the east side of the cloister, next to the church. Further along was the chapter house, where the monks read from the Rules of St. Benedict and carried out other affairs of the monastery, including matters of discipline. A passageway that connected the cloister to the garden separated the chapter house from the scriptorium, the monastery's library and the room where manuscripts were written and illustrated. On the south side of the cloisters was a warming room, the only space in the monastery other than the scriptorium that would have been heated; the kitchens; and in the center of the south side, the *refectory* or dining hall, a large space where the monks ate in silence while one monk read sacred texts to them from a lectern. Instead of lying parallel to the side of the cloister, as was the case in most monasteries, the refectory at Fontenay was oriented perpendicular to it. The refectory, which was demolished in 1745, and the fountain building are the only major parts of Fontenay that no longer exist.

Still within the walls of the abbey, but separate from the monastery proper, were buildings used by the secular world: a chapel and quarters for visitors, barns and cellars for storing food and wine, living quarters for the lay brothers, a dovecote, a bakery, and a forge. One of the few buildings of its type to survive in France, the forge is impressive in size (172 feet long and 44 feet wide) and construction. The watercourse that supplied both water and water-power for the forge remain in good shape. Later than these buildings are the present gatehouse, built in the fifteenth and sixteenth centuries, and the abbot's house, built in the seventeenth century and now used by Fontenay's owners as a private residence.

Architectural Details: The Abbey Church

Sober, dignified, exquisitely simple on both the exterior and interior, the church is large—215 feet long—but not overwhelming. Its plan is a *Latin cross*, with a long nave; two *transepts*, the short arms of the cross, each with two square chapels that project from its east wall; and a square apse. Heavy

stone piers divide the broad nave into eight bays and two side aisles. Square projections (*pilasters*) on the nave side of the piers rise up to the point from which the *vault* begins to curve inward. The pilasters continue visually across the tunnel vault as rectangular stone bands. Both the nave and side-aisle vaults are pointed, not semicircular as is typical of Romanesque churches, indicating how close to the Gothic period Fontenay was built. Adjacent nave piers are connected by arches supported on columns attached to the sides of the piers. These structural elements on the interior, short perpendicular walls (salient buttresses) on the exterior walls that help support the nave vault, and moldings around the arches are the only things that interrupt the smooth surfaces of the walls. They are so simple they scarcely qualify as ornament. The church's roof rests directly on packing above the vaults, so there is no attic and therefore no rafters or trusses above the nave.

Because Cistercians forbade stained glass, which lets in relatively little light, windows in their churches could be relatively small. Without an upper gallery in the nave, and with no windows in the walls above the nave arcade, the only light in the interior comes from the seven windows in the west facade and a few windows in the apse and the transepts. All these windows were filled with plain glass cut into simple geometrical shapes held in place, as with stained glass, by lead strips and an iron framework. (The reconstructed windows are based on those that still exist in another Cistercian church.) Though relatively dark and monochrome, the church at Fontenay is not somber. The shapes of the vaulting and the carefully proportioned volumes diffuse light remarkably evenly through the interior. For Bernard, proportions corresponded to his description of God as "length, width, height, and depth," a higher form of beauty than sculpture and painting, which he felt distracted worshipers and interfered with deep meditation. Bernard loved music, and he felt that architectural proportions were a physical manifestation of musical harmonies. Interiors in Cistercian churches were, therefore, carefully designed to enhance the chanting that was a part of most, if not all, of the services. Anyone who has heard plainchant performed in a Cistercian church appreciates how essential a part acoustics play.

Stairs in the south transept led up to the monks' dormitory, where they slept, fully clothed, so that they could descend directly to the night services (for example, matins at 1:00 AM). Monks participated in seven services held at regular intervals throughout the day and night.

In contrast to the church, the cloister and chapter house are light and airy and differ in how they are covered. Ceilings in the chapter house and the monks' workroom under the dormitory have ribbed vaults characteristic of Gothic architecture. Even though built after those at St. Denis, which introduced the Gothic style, Fontenay's vaults are nevertheless very early examples of the new structural system. Cistercians were conservative, however, and did not follow up on the implications of this innovation for decades, by which time it was widely used.

Fontenay's Decline and Restoration

Fontenay gradually became rather wealthy, eventually owning many large estates, which it farmed or supervised. The abbey was especially famous for trout and pâtés and rigorously enforced laws against anyone who poached trout from the river it controlled. It also produced great quantities of flour, oil, cloth, and wood. This trade was especially lucrative for the abbey, since King Louis IX (St. Louis) had exempted it from all taxes. Otherwise, nothing of historical significance occurred at Fontenay. Internally, life was generally as quiet and peaceful as its architecture although, being a repository of great wealth, Fontenay was repeatedly attacked by bands of thieves and armies marching through the region. Because of these attacks, a wooden palisade and, in the fourteenth century, a stone wall were constructed around the abbey. After English soldiers attacked in 1359, Edward III of England gave money to restore the abbey. Germans, Burgundians, and Armagnacs breached the outer walls several times between 1440 and 1450, and in 1590 and 1595, but the abbey buildings seem to have suffered very little. Both the Cluniac and Cistercian Orders declined with the popularity of the mendicant orders, especially the Dominican and Franciscan Orders, in the thirteenth and fourteenth centuries. The “commendatory” system, when abbots were named from outside the monastery, often because of favors they had done for the king, accelerated the decline of the monastery in the seventeenth and eighteenth centuries.

Like all religious establishments, Fontenay was declared government property after the French Revolution. The last religious service was held on October 29, 1790, on the 672nd anniversary of the abbey's founding. By this time, however, there were no more lay brothers at the monastery and only eight monks and their three servants. In October 1791, anything of value—the library, the clock, bells, and furnishings—were sold at auction. Claude Hugo bought the buildings and property. He turned the monastery into a paper factory, which he then sold to a Parisian, Eloi Guérin. In 1820, Guérin sold Fontenay to Elie de Montgolfier (of hot-air balloon fame), who sold it to Marc Seguin, his son-in-law, the “father of the French railway.” Seguin protected the abbey from further devastation, though it remained a paper mill until 1902. It has remained within the extended Montgolfier family, which has continued restoration.

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GERMIGNY-DES-PRÉS: PARISH
CHURCH, GERMIGNY-DES-PRÉS,
NEAR ORLEANS IN THE LOIRE
VALLEY

Style: Carolingian

Date: 806

Architect: Possibly Odon

A Rare Example of Carolingian Renaissance Architecture

Despite an overly ambitious restoration in the nineteenth century, the parish church of Germigny-des-Prés, a few miles to the east of Orleans in the Loire Valley, is the most nearly intact church from the Carolingian period in France; indeed, it is one of the few extant buildings in France that were constructed between 500 and 1000 c.e., a period of great political and social upheaval. As such, it is precious evidence of the reign of Charlemagne (about 742–814), who conquered much of Europe and had himself crowned the first Holy Roman Emperor on Christmas Day 800. From the fourth century, large cities of the Western Roman Empire had been abandoned, which

meant that the ability and need to create monumental art and architecture had been lost, most books had been destroyed, and society, in France at least, was largely illiterate. According to his biographer Einhard, even Charlemagne, the Holy Roman Emperor, never mastered writing. Recognizing what had been lost, he tried to restore some of the glory and culture of the ancient Roman Empire and to reestablish Roman arts and crafts, including its architecture. Germigny-des-Prés, the private chapel of one of his closest advisors, Theodulf, Abbot of St. Benoît and Bishop of Orleans, was part of this “Carolingian Renaissance,” as many scholars refer to it. Rather than Roman influences, as in other Carolingian buildings (the emperor sent his architects to Italy to study Roman remains), it combines influences from contemporary Byzantine and Islamic cultures, both of which had maintained and created high standards of civilization and culture. As such, it is nearly unique in France.

Though now a parish church, Germigny-des-Prés was originally Theodulf’s private chapel, which had been added to a villa that was built when France was part of the Roman Empire. The chapel or oratory was finished in 805 and, according to an inscription in the church, dedicated on January 3, 806. The architect may have been an Armenian named Odon, but this is not certain. The villa was considered a royal palace, and the French king, Charles the Bald, had stayed there several times, at the very least in 843 and 844.

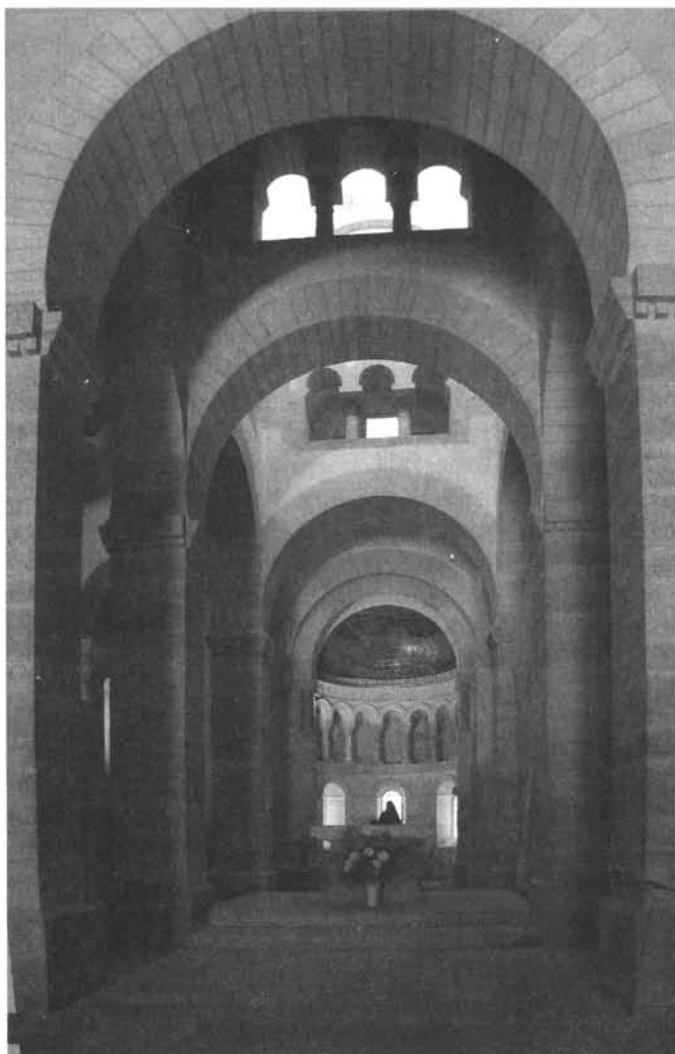
The Client: Bishop Theodulf

Bishop Theodulf was born around 750, probably in Visigothic Spain. He studied in the abbey of Aniane (between Montpellier and Lodève in modern France) and became, with Alcuin, one of Charlemagne’s most faithful counselors and one of his “missi dominici” (royal envoys). In 798, Charlemagne made him both bishop of Orleans and abbot of Saint-Benoît, the abbey in which Saint Benedict, the founder of Catholic monasticism was buried. Theodulf was to develop teaching, establish libraries (the one at Saint-Benoît, three miles west of Germigny, was the largest in Europe in its time), train clergy, and deliver justice. From 806 to 816, he worked in the calm of Germigny. When Charlemagne died in 814, Theodulf was at first trusted by the French king, Louis le Débonnaire, but in 818 he was accused of treason and confined to a monastery in Angers until his death in 821.

Germigny-des-Prés remained a place of royal visits, and a regional synod was held in the church in 843. The church survived both fire and Norman invasions (856 and 844) in the ninth century. In the thirteenth century, it was made into a parish church. It was classed a historic monument in 1839, and drastically restored under the architect Lisch a few years later.

The Plan

The plan of Germigny-des-Prés, which resembles a tic-tac-toe grid, is a *Greek cross* (equal-arm cross) inscribed in a square, 32 feet on a side. Square



Germigny-des-Prés (806), although extensively rebuilt in the nineteenth century, is a rare survivor from the Carolingian period (ninth century).

piers at the corners of the *crossing* (the central square formed by the intersection of the arms of the cross) support a tower 40 feet high, called a “lantern tower” because much of the light in the church comes through openings in it. The church is not oriented to the cardinal directions, as was customary at the time; the semicircular apse containing the high altar faces the northeast. This projection is the only one of the four original apses still extant that were built on the ends of the Greek cross. There were two more apses framing the one containing the altar, but they, too, have disappeared. This type of

plan closely resembles churches being built in the Eastern (or Byzantine) Roman Empire, that is, in the modern Middle East, particularly churches in Turkey or in Armenia.

None of the apses are—or were—pure semicircles in plan, however, as would have been the case in the Byzantine churches. Nor are the four large arches that connect the crossing piers and support the lantern tower half-circular; instead, they and many of the smaller arches in the church are horseshoe-shaped, that is, they are more than semicircles, motifs that indicate Mozarabic influence. (Mozarab is the name given to Christians who fled from Muslim Spain; see **Saint Michel de Cuxa**.) This Spanish/Mozarabic influence seen in the arches and some aspects of the decoration is not surprising, since Theodulf was born in Spain.

The mosaic decorations (made from small cubes of glass and colored stone) that cover the semidome over the main altar show further Byzantine influence. They are similar to those in some churches in Greece, Transjordan, and the fifth-century church of Santa Maria Maggiore in Rome. They are certainly unlike decorations in other churches of the period in France, indicating that the artist who produced them was most likely from the East, and it is quite possible, given the date of the church, that he had escaped from the iconoclasts (those opposed to images in churches) in Byzantium. He probably had trained locals to assist him. In the mosaics, the hand of God reaches down to the Ark of the Covenant. It is guarded by two cherubim and two large angels, below which is an inscription: “See and contemplate the holy oracle with its cherubim and the resplendent ark of the divine testament. Before this spectacle, strive to touch the Master of Thunder with your prayers; and, I pray of you, remember Theodulf in your prayers.” These mosaics are some of the few surviving original decorations.

The “Restoration”

When the architect, Juste Lisch, restored the church in 1867–1876, he changed so many things that one must consider the present church a reconstruction. He replaced much of the original Carolingian masonry, destroyed most of the original decoration, and invented numerous elements. For example, he removed the two smaller apses that flanked the main altar, reduced the height of the lantern tower by one story, and created a dome at the top of this tower that had never existed. He destroyed most of the stucco friezes that had decorated the interior and replaced most of the column capitals in the church. The block on top of the northeast pillar at the crossing is original, kept because of its inscription (“This church was dedicated on the third of January”), but that on the southeast (“In the year of the incarnation [of our Lord] 806, under the invocation of saints Geneviève and Germain”) is probably a crude, nineteenth-century copy. The mosaics also suffered during restoration, but drawings from 1841 give us a good idea of the original composition. The frescoes that were used to decorate most of the church were already fragmentary by the middle of the eighteenth century.

Originally, the main entrance to the chapel was in an apse opposite the main altar. It was destroyed during the Norman invasions and rebuilt afterward, but it was finally replaced by a nave, probably about around 1065, when the chapel was made into a parish church. That nave, in turn, was replaced in the fifteenth or sixteenth century by the present, modern, longer one.

Architecturally, Theodulf's church is unique in Gaul. There was nothing like it in its time. The combination of influence from Byzantine and Islamic models helps us understand that travel was much more extensive during the period sometimes called the "Dark Ages" than many think. Above all, the church reflects the personality of a remarkably cosmopolitan and highly educated client, Bishop Theodulf, who appeals to us in an engraving preserved under the side porch, above the door, as he does in the mosaic inscription: "I, Theodulf, have dedicated this temple to the glory of God. All you who come to this place, remember me."

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GRANDE ARCHE (GRAND ARCH), PARIS

Style: Modern

Dates: Competition, 1983; Construction, 1984–1989

Architects: Johann Otto von Spreckelsen (1929–1987) with Paul Andreu (1938–)

The Grande Arche (the Grand Arch), the white marble cube that ends the view from the **Arc de Triomphe** to the west of Paris, is grand indeed: 354 feet wide, 360 feet high—the height of a thirty-five-story office building—and 367 feet deep. It is the most impressive urban monument built in Paris since the Arc de Triomphe and in many ways comparable to it. The Grande Arche is the latest in a sequence of monuments built along what the French refer to as the Grand Axis. It starts at the Cour Carrée of the **Louvre**, continues through the Tuileries Gardens and the **Place de la Concorde**, down the Champs-Élysées between the legs of the Arc de Triomphe and,



Designed in 1983 by Johann Otto von Spreckelsen, the Grande Arche (the Grand Arch) is the most recent monument along Paris' Grand Axis, the string of monuments and public squares that extends several miles west from the Louvre.

until the Grande Arch was built, disappeared over the top of a hill that had, since the 1960s, been turned into a “mini-Manhattan” called La Défense.

The “Head” of the Grand Axis at La Défense

La Défense was part of a 1931 competition to create a modern district of Paris. Another competition followed in 1935, but the economy and then the Second World War prevented anything of either competition from being carried out. In 1958, however, the CNIT (Centre National des Industries et des Techniques) was built at La Défense by Robert Edouard Camelot, Jean de Mailly, Bernard Louis Zehrufuss, and the engineers Nicolas Esquillan and Pier Luigi Nervi as consultant. When it was built, it covered the largest area of any single reinforced concrete roof (220,000 square feet) and had the largest span—715 feet between supports—of any reinforced concrete structure. This convention center was conceived as the catalyst for a modern, ultraefficient commercial and residential complex that would cover more than 1,800 acres between Puteaux and Courbevoie, two villages at the edge of Paris. Skyscrapers and lower residential buildings were planned to surround a central plaza 320 feet wide and nearly a mile long that would terrace down the La Défense hill to the Seine River. (The name La Défense comes from a monument on the site to soldiers who had defended Paris from Prussian troops in 1871.)

The first schemes for La Défense, designed by several winners of France's most prestigious architectural award, the Rome Prize, were a mix of academic Beaux-Arts formal compositions and extreme modernism. A six-lane super-highway was built to surround the pear-shaped building zone and a many-leveled parking garage under the central platform. For more than a decade, however, almost nothing further was built. Few people wanted to live at La Défense and most companies wanted larger buildings than those proposed in the original plan. They also wanted "image" buildings, skyscrapers whose form immediately identified the company, instead of the rather banal modernism that had been proposed. The institution set up in 1958 to build the infrastructure for La Défense (EPAD: Etablissement public pour l'aménagement de La Défense) was losing enormous sums of money, and finally allowed anyone to build whatever they wanted, wherever they wanted. A chaotic scattering of mostly mediocre buildings resulted, creating a skyline visible from central Paris on clear days that compromised the image of the Arc de Triomphe.

In 1969–1970, a real estate developer (Sefri) asked Chinese-American architect I. M. Pei to design the tallest building in Europe, a skyscraper of seventy-two to eighty floors (around 800–900 feet) for La Défense. Pei shocked everyone by proposing a pair of skyscrapers over 660 feet (sixty stories) high *on the Grand Axis*. He argued that the only way any coherence could be given to the chaotic grouping of skyscrapers was to create an extremely strong symbolic presence in the midst of them. His project, which went through many refinements over the years and became the famous "tuning fork" design, was never accepted; but his argument and major aspects of his design gradually were. In the meantime, a series of alternative projects by French architects for what came to be called the Tête de La Défense (Head of La Défense) was also rejected.

Von Spreckelsen Wins the New Competition

In 1983, President François Mitterrand proposed an international competition to find a solution for what had become a politically sensitive project. It attracted 424 entries and was won by a Danish architect, Johann Otto von Spreckelsen, who was known mostly for relatively small churches. His winning entry was for a white marble cube, twice as tall as the Arc de Triomphe, clad in Carrara marble. The sides parallel to the Grand Axis were to be solid, but the other two sides would be open. Essentially, instead of ending the Grand Axis, he proposed a huge frame that would allow it to continue.

As he developed the project, von Spreckelsen realized that he would have to turn his cube $6\frac{1}{2}$ degrees away from the Grand Axis to accommodate the twelve foundation pilings that had to be fit between the tangle of train and subway lines that criss-crossed under the site. He realized that, rather than weakening his idea, the slight angle would help the frame to appear to have

more volume when seen from a distance. By coincidence, the Cour Carrée of the Louvre was twisted the same $6\frac{1}{2}$ degrees at the other end of the Grand Axis. That pleased von Spreckelsen.

He objected to the gradual transformation of his “window on the world”—“humanity’s triumphal arch”—into an office building to finance the project: The sides of the cube became two thirty-five-story office blocks, 300 feet long and 60 feet deep. Von Spreckelsen resigned in protest on July 31, 1986, and asked for his name to be removed from the project. He died the next spring.

The Grande Arche Today

The Grande Arche was finished in time for the two hundredth anniversary of the French Revolution in July 1989. The Ministry of Public Building and Works occupies most of the two office buildings, and the top is, as von Spreckelsen intended, a museum dedicated to the Rights of Man. A human sciences foundation set up by Danielle Mitterrand, the president’s wife, is another occupant. Under the white marble steps leading up from the central plaza to the arch is a space for temporary exhibitions. Von Spreckelsen had intended a free-form glass sculpture of “clouds” to be created in the opening of the arch. Glass turned out to be too expensive, so Paul Andreu, who took over from von Spreckelsen, designed the “clouds” as a fabric and steel tension structure, for which Peter Rice, who also worked on the **Pompidou Center**, contributed the engineering expertise. A steel cage contains four glass elevators that take visitors to the viewing platform on top of the arch. Ten-foot-tall glass panels had to be erected toward the rear (west side) of the arch because the giant frame created a wind tunnel effect. Even compromised, the Grande Arche accomplished what von Spreckelsen wanted: a window to the world that brought order to chaos.

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GRAND THEATER OF BORDEAUX (GRAND THÉÂTRE DE BORDEAUX), BORDEAUX

Style: Neoclassical

Dates: 1773–1780; restored 1990–1992

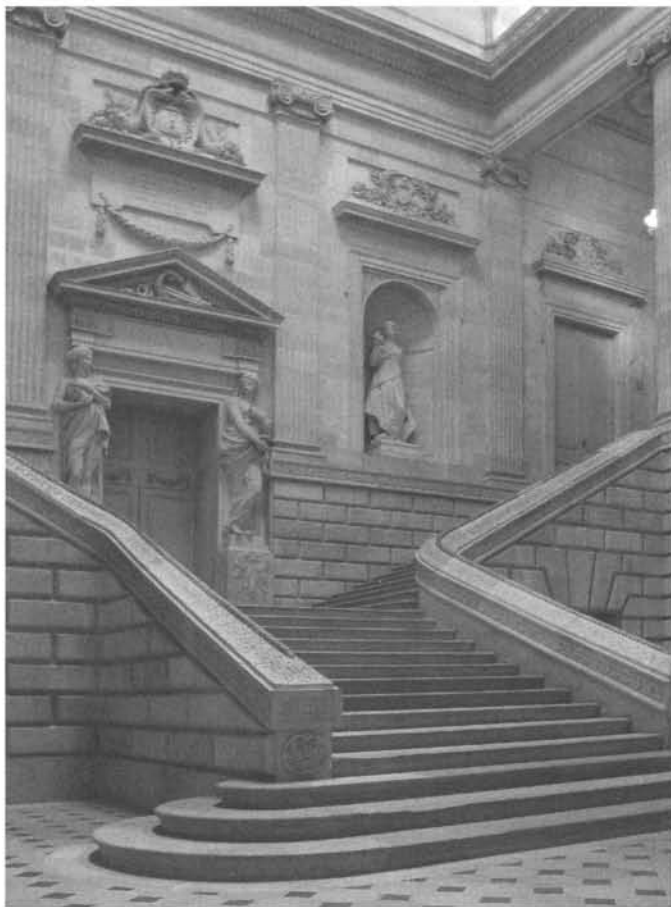
Architect: Victor Louis (1731–1800)

The Grand Theater is one of the most beautiful monuments in Bordeaux's unique ensemble of eighteenth-century architecture. It was the largest and most splendid theater in Enlightenment France, the France of Voltaire, Marivaux, and Beaumarchais. Often compared to the opera in the Palace of Versailles, built at the same time, the Bordeaux theater is architecturally more advanced. It inspired countless theaters and opera houses, most notably Charles Garnier's **Paris Opera**.

When its new theater was built, Bordeaux was the richest city in France after Paris. Between 1715 and 1790 its population had doubled, and it had been extensively rebuilt, transformed from a Medieval walled town into a modern eighteenth-century city. In the middle of this transformation, in December 1755, a fire destroyed Bordeaux's theater. A temporary replacement proved unsatisfactory, and rival cities (Avignon, Lyons, Paris, and Montpellier) had built fine new theaters. Marshal de Richelieu, the governor of the province (Guyenne) of which Bordeaux was the capital, wanted one at least as splendid. He imposed his choice of architect, Victor Louis, and got the king to donate the building site, a piece of land that sloped up to the fortress of la Trompette, which was soon to be torn down and replaced by a new quarter of the city.

Victor Louis

The son of a Parisian mason, Victor Louis was a prodigy who had entered the royal academy of architecture before he was fifteen and received its grand prize in 1755, which permitted him to spend from 1755 to 1759 in Rome. He had redesigned the Gothic *choir* of **Chartres Cathedral** in a "modern" style, rebuilt Richelieu's townhouse in Paris, and, shortly before the theater commission, had designed the elegant townhouses surrounding the gardens of the Palais Royal in Paris. He therefore arrived in Bordeaux, at the end of April 1773, a famous and experienced architect. His plans were approved on May 18th. Construction began shortly thereafter and continued for six years. Difficulties in financing and political disputes among civic authorities, fi-



Bordeaux's Grand Theater (1773–1780) is one of the most important of the early public theaters and influenced many other theaters and concert halls including the Paris Opera.

nancial speculators, and representatives of the king (who died during construction) caused many interruptions. On April 7, 1780, the theater was inaugurated with a performance of Racine's *Athalie*.

General Description of the New Theater

For a stylistic model, Victor Louis, like most other architects of the time in Bordeaux, used the structures on the Place Royal (now Place de la Bourse), the superb new (1730–1755) city square just to the south and east of the building site for the new theater. For the Place Royal, Angès-Jacques Gabriel and his father had consciously returned to the grandeur of the architecture of King Louis XIV's reign. Victor Louis's theater is both simpler and grander than its model, a large rectangular stone block, 154 feet wide and 288 feet

long with a portico of two-story columns along the entire front. The *colonnade* was controversial, the first time one had been used for the facade of a French theater. Some critics argued that colonnades were appropriate only for religious buildings; others countered that this *was* a temple, a “temple of the muses,” and since there was no *pediment*, the theater would not be confused with a church. Large statues—nine muses and three goddesses (Juno, Minerva, and Venus)—were placed above each of the twelve *Corinthian* columns. Victor Louis chose the Corinthian order for the portico columns and those in the auditorium (and for the *pilasters*, flat strips analogous to columns, on the sides and back of the theater) because of the order’s historical association with royalty, in other words to please Richelieu. Originally, the tall pedestals supporting the columns sat directly on the ground, and spectators descended from their carriages directly onto the portico floor. Street levels around the theater were lowered in the mid-nineteenth century, however, causing both structural problems for the theater and the addition of stairs across the entire front of the theater.

Commercial facilities were incorporated in the building to provide revenue to build and operate the theater: shops selling luxury goods on the south side of the building behind the ground floor arches; a restaurant, shaded by an awning, on the north side; a café above it on the second floor; storage rooms in the basement; and twelve apartments, originally intended for visiting artists but soon rented to the public. A large concert hall, rehearsal rooms, and meeting rooms supplemented the main auditorium.

As the son of a stone mason, Victor Louis was adept at choosing types of stone, both for the exterior and the interior, according to whether a given part of the building was structural or ornamental and to what extent it was exposed to the weather. He was especially attentive to the shapes of individual stones and to the patterns formed by their joints (*appareillage*), an important consideration since the masonry was exposed in all major parts of the building but the auditorium, covered neither by paint nor revetments. This attention to the construction joints, as much as anything, makes the theater quintessentially French, and recent cleaning of the exterior, the vestibule, and the grand staircase has reestablished the importance of the *appareillage*.

The Theater Building as Theater

Louis devoted a third of the length of the building, about the same floor area as the auditorium, to a dramatic sequence of entry vestibule, atrium containing a grand staircase to the auditorium, and reception and intermission spaces, which open onto the atrium. There was no equivalent in other European theaters, though there were precedents in Baroque palaces such as the Würzburg Residenz, Caserta, or Versailles. With the Grand Theater’s entry sequence, especially the atrium and grand staircase, Victor Louis set a new standard for theaters, operas, and concert halls. His vestibule was intended to be a transition between the noisy real world and the fantasy world of drama.

It is relatively dimly lit and low-ceilinged, which makes the high, top-lit atrium beyond that much more dramatic. Louis made the atrium with its grand stairs a theater in and of itself: galleries that open to the atrium on upper levels become balconies from which to watch the “performance” on the staircase or on the galleries opposite. The staircase is designed for promenading as much as for getting to the auditorium. Its first flight, on axis with the vestibule, splits in two at the landing in front of the first entry into the auditorium, a monumental doorway, guarded by statues of women (Melpomene and Thalia), to the most expensive seats in the auditorium. The second two flights of stairs lead, to the right and left, to the second level and the galleries from which the second level of seating, the intermission foyers, and (originally) a concert hall were entered. All parts of the vestibule and atrium—walls, floors, stairs, and ceilings—are exposed stone and have changed little since the opening of the theater, though at one point the stone walls were painted. Stripped of paint in the nineteenth century, they were recently steam cleaned and have regained their original light tones.

Square in plan, the atrium resembles in many respects the exterior entry courtyard of an eighteenth-century town mansion, except that it is covered by a *cloister* vault (a domical vault built on a square plan). Both the *coffers* in the vault and the skylight in its center are reminiscent of the dome of the Pantheon in Rome, to which Louis no doubt refers. Unlike the Pantheon’s, Bordeaux’s skylight is glazed; supplementary, indirect daylight comes in through arched openings on the third level of the atrium.

The Auditorium

The auditorium in the Grand Theatre is large for the period, comparable or superior in size to theaters in Lyons, Milan, Rome, Naples, or Paris. Victor Louis, like Peyre and de Wailly in Paris’s Odéon theater, based its plan on a circle, from which he cut away about a quarter for the proscenium arch. Two levels of balconies project from between twelve colossal, two-story high columns arranged around its circumference, whose bases are set on a gallery level one story above the floor of the auditorium. Because the seating area was extended beyond the diameter of the circle to create a horseshoe shape, the end boxes (for the governor and the city administrator) have only partial views of the stage. The original 1,700 seats in the auditorium have since been reduced to 1,114 to increase the size of the orchestra pit. A shallow dome supported by four large arches and *pendentives* covers the auditorium. Seats for the lower classes were set into the half-domes—ironically nicknamed the paradise—framed by the arches on three sides of the auditorium.

By 1798, infiltration of water ruined Jean-Baptiste Claude Robin’s painting on the dome. It has been replaced several times, the last in 1917 by the Bordeaux artist Roganeau, who re-created Robin’s painting, which had been preserved in a sketch. The original stage curtain, whose design gave the illusion of extending the architecture of the auditorium, has also been reconstructed.

Technical Characteristics

Victor Louis was extraordinarily attentive to the technical aspects of the building, especially acoustics—his wife was an accomplished singer and forte-piano player—but also lighting and ventilation. The interior of the auditorium is built of carefully selected pieces of wood lightly covered with decoration. Acoustics in the auditorium, likened by a contemporary critic to a vast instrument, are exceptional.

Instead of a chandelier, which he said glares in the faces of the spectators (lights were not dimmed during performances) and drips candle wax on them, Louis put sconces with reflectors, which created an indirect light, on the columns and fifty lamps above the cornice. To ventilate the auditorium without a noticeable draft, he built, at the height of the dome, a false floor seven feet high with windows in its outer walls that could be opened and closed. The stage was especially large for the time, 82 by 82 feet, and accommodated a complex system for flying scenery (that was kept in the recent restoration alongside new, state-of-the-art equipment). Conscious that theaters burned down frequently in a time when only open flame was available for lighting, Louis installed ten stone exit stairs so audiences could be quickly evacuated and, to fight fires, a system of reservoirs for water (later determined to have been ineffective).

Louis thought of the theater as an important piece of city planning, and he took advantage of the theater commission to redesign the blocks around it, making it the focal point of a new quarter of the city. The main thoroughfare, the broad Allée Tourny, intersects the streets around the theater at an angle. Like the views created in contemporary set designs, the main view of the Grand Theatre's facade is, therefore, oblique.

Subsequent Modifications to the Grand Theater

An immediate and great success with the public as well as critics, who considered it one of the masterpieces of French architecture, the Grand Theatre nevertheless underwent various subsequent modifications, both profound and superficial. Though the concert hall Louis had designed above the vestibule was demolished, to the regret of most, Louis's basic structure was always retained. His original color scheme for the auditorium and some of the details were not. His was a predominantly white auditorium: columns were white and the rear walls were painted to look like veined, white marble; moldings on the cornices were gilded, as were the column capitals, garlands on the entablature, and highlights of other ornaments; and blue draperies were painted on the rear walls. Doors and some panels were decorated with delicate arabesques. In the nineteenth century, these decorations disappeared in several remodelings.

Charles Burguet started a complete reconstruction of the theater in 1852. He returned the auditorium to its original appearance, except that he replaced Louis's blue, white, and gold color scheme with the then-popular red,

old-gold, and white. He also created the Grand Foyer in place of the horrendous reception room that had replaced Louis's concert hall. In 1990, Bernard Fonquernie began a thoroughgoing restoration of the entire building. He installed modern stage machinery while respecting the soul of the theater, and he restored the original color scheme in the auditorium.

The French Revolution destroyed Victor Louis's career. He was planning to leave for the United States when he died on July 2, 1800, at the age of sixty-nine.

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HÔTEL SOUBISE, PARIS

Style: Rococo

Dates: 1735–1737

Architect: Germain Boffrand (1667–1754)

In 1704, François Rohan, the Prince de Soubise, commissioned a new hôtel (town mansion) from the architect Pierre-Alexis Delamair. Entry to the hôtel, now the French National Archives, is through a triumphal arch in a concave, semicircular wall and into a courtyard. *Colonnades* lead down both sides of the large courtyard to the mansion, which is typical of the restrained Baroque that was fashionable in the capital at the time. Far more significant than the mansion, however, are the interiors that the prince's son and heir, Prince Hercule-Mériadec de Rohan-Soubise, Duke de Rohan, commissioned from Germain Boffrand in 1753. Although parts of the apartments were destroyed or remodeled when the Hôtel Soubise was turned into the National Archives in 1808, the rooms that exist are among the finest French Rococo interiors to have come down to us.

The Rococo

“Rococo” is a term derived from the *rocaille* (rocklike) motif, an irregular C- or S-shape that appears in much Rococo decoration. As a stylistic term, Rococo refers to the lighter style of architecture, and particularly decoration, that was a reaction to the heavy, grandly sumptuous architecture of all but the last years of Louis XIV’s reign. It corresponded to the general rejection of the extreme formality of court life at Versailles in favor of a life, chiefly in Paris, that was more casual and centered on comfort. Like the 1900s Art Nouveau phenomenon (such as the Paris **Metro Stations** and Hector Guimard’s apartment buildings) which it resembles, Rococo was relatively short-lived, lasting scarcely more than twenty-five years.

Interiors during the reign of Louis XIV tended to be as regimented as the plans of residences and the life of aristocrats. Representations of structure, especially *pilasters* (columns flattened against a wall), divided rooms into discrete panels. *Cornices* (and other moldings) tended to be heavy and strong, clearly marking the intersection of wall and ceiling. Interiors were sumptuous, grandiose: dark marbles for pilasters; heavy gold for moldings and trim; and broad, serious frescoes or wall paintings framed and separated by moldings and structural members.

A tendency for interiors to become lighter that was apparent even before Louis XIV died became pronounced when his great-grandson inherited the throne. Rooms became smaller, more human in size and scale; furniture became more comfortable; kitchens were located close to dining rooms; pastel colors and white predominated; moldings and architectural frames were eliminated or reduced to delicate arabesques that imparted a sense of movement to rooms where stability had been the rule. Geometrical regularity gave way to whimsical form. In short, the masculine gave way to the feminine.

Robert De Cotte, who had assisted in designing the chapel in the palace at Versailles, was one of the first to begin the change in direction, but it was his younger collaborator, Boffrand, who created the definitive examples. Apartments for the Prince and Princesse de Soubise were just one of many commissions. The prince’s apartment was on the ground floor of a pavilion that Boffrand added to a wing of the Soubise mansion; the princess’s apartment was directly above.

Apartments of the Prince and Princess

In both apartments, the dominant room was an oval salon, a relatively large reception room that projected into the garden at the rear of the hôtel. Both salons retain their original decor. In the prince’s salon, the wood paneling is painted a soft green and surmounted by plaster reliefs. Transom panels above the doors were painted by Van Loo, Boucher, and Tremolières. A masterpiece of Rococo in its own right, recently well restored, it is not as fine as the oval salon of the princess.

The paneling in the princess’s salon is painted white with delicate gilded

moldings and rocailles in the lower portion. Tall, arched niches alternate around the room with lower, narrower, arched panels. Some of the niches contain mirrors as their back surfaces, some have windows, and one has a mirror over a delicately carved fireplace. Above the panels, which are topped with shallow arches on which cherubs sit, are eight roughly triangular panel paintings by Charles Natoire representing the history of Psyche. Above the niches are circular medallions, and above Natoire's paintings are very irregular shields framed by rocailles. These medallions and shields form part of a wide, highly decorative band that undulates around the room. Part of it extends up into the blue ceiling. It is all very pretty and very far from the Grand Style of Louis XIV.

Boffrand does not base his interior on pure geometric forms, as architects of the Grand Style would have. There is no sense of structure in the room; there are no pilasters and no cornice separating wall from ceiling. There are no walls in the traditional sense, just a continuous movement around the edge of the room, and no distinction between wall and ceiling; indeed, the designations do not make sense. Depending where one stands in the room, the mirrors may reflect either panels, other mirrors, or windows, or they may make it seem that there is no wall in that section. It is no longer clear what is real and what is reflection, especially when several people are in the room and they are reflected multiple times in the mirrors.

All these ambiguities are intentional, of course, a kind of aristocratic, eighteenth-century funhouse for a fun-loving aristocracy. It is easy to imagine that, as the Age of Reason wore on, such delights appeared frivolous, especially when carried to extremes by artists like Juste-Aurèle Meissonnier. One of the most representative practitioners of the Rococo style, he was trained as a goldsmith, and Rococo was closely related to, perhaps ultimately derived from, jewelry, which its detractors pointed out. The style was also denigrated as "Gothic" by some contemporaries, and, in any case, *Flamboyant* Gothic and Rococo decorations are similarly exuberant and decorative. *Philosophes* (the intellectuals of the period) and their architects, including Boffrand himself, reacted against the Rococo. Even buildings for the king, for example, the Petit Trianon at Versailles, finished just before the end of his reign, return to the disciplined order of Louis XIV's reign. But the Rococo was fun while it lasted.

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INVALIDES, PARIS

Style: Baroque

Dates: Hospital (Hôtel des Invalides), 1671–1678; Church of the Dome (Église du Dôme), 1678–1706

Architects: Libéral Bruant (1635–1697) and Jules Hardouin-Mansart (1646–1798)

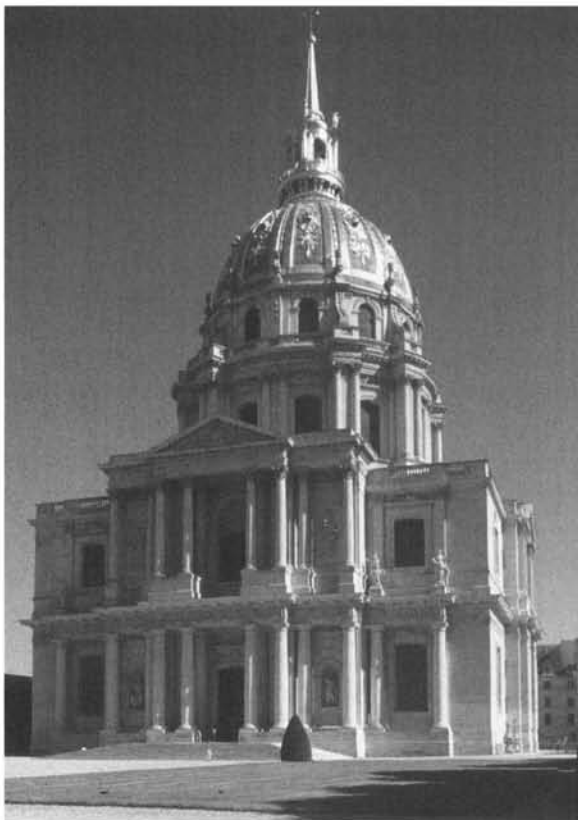
There are three parts to the Invalides, one of the most visited monuments in Paris: a hospital; a large church connected to the hospital; and Dome of the Invalides, which is an extension of the hospital church. The first two parts are interesting; the Dome is one of the finest examples of French Baroque architecture and was decorated by some of the greatest artists of Louis XIV's reign (Mignard, Coypel, Coysevox, and Coustou). There is also a tourist attraction beneath the dome, added much later: Napoleon's tomb.

A Hospital for War Veterans

There had been proposals for a veterans' hospital in France as far back as the reign of Louis XI (1461–1483), but it was King Louis XIV who commissioned the Invalides in 1668, which was to house up to 7,000 veterans of his many wars. Until then, wounded soldiers or those too old and feeble to take care of themselves had been cared for in monasteries, but the numbers of monks had been decreasing and the number of veterans increasing.

Louis chose a site on the plains of Grenelle, at the edge of what was then the farthest west suburb of Paris, the faubourg Saint-Germain. What was open countryside is now in the center of Paris, near the **Eiffel Tower**. Libéral Bruant, the architect, was well qualified. He had already built the huge Salpêtrière hospital (which still exists) for infectious diseases. His plan for the Invalides is similarly clearly ordered and functional, characteristic of hospitals of its time. A rectangular grid of buildings and courtyards is arranged around a long, central courtyard. At the center of one end of the courtyard is the entry to the soldiers' church; opposite it, on the north side, is the main entry to the complex.

An esplanade, created in the eighteenth century, leads from the Seine River up to the main entry. This magnificent arched portal, restored after it was destroyed during the French Revolution because of its sculptures glorifying Louis XIV, is the only decoration in the austere, 650-foot-long main facade that housed the administration. The other three sides of the central courtyard are enclosed by two-story buildings with arcades on both floors. They are austere and repetitive, interrupted only by projecting entry pavilions at the center of each side. On the ground floor on each side were din-



The Invalides in Paris (1671–1706) is a veterans' hospital and a church for aristocrats that was adapted in the nineteenth century to house Napoleon's tomb. To the degree there is such a thing as French Baroque, it is a prime example.

ing halls and infirmaries, above and around which were arranged dormitories grouped around small courtyards. Comfortable for the period, the dormitories had rooms with six to eight beds for soldiers and two to three beds and a fireplace for officers. Only the dining halls and a grand salon were decorated. Two wings of the hospital extend to the south, past the church at the end of the courtyard, one wing for the bakery, the other for housing priests. The hospital was built with remarkable speed, the east half of the main courtyard between 1671 and 1674, the rest by 1678. Bruant's symmetrical, modular design permitted several contractors to construct parts of the building simultaneously.

The Soldiers' Church

With more than 7,000 inhabitants, Invalides was as large as a small city at the time, and required a correspondingly large church. St. Louis, the sol-

diers' church, is very long and rectangular, with a stone vaulted *nave* and side *aisles*. Its interior is as undecorated as the exterior facades of the hospital into which it is built—except for its entry, the church is virtually invisible from the courtyard. The great dome that can be seen from much of Paris is above the second church, the Church of the Dome, which is connected to the soldiers' church through a huge opening. The Church of the Dome is inaccessible from the hospital side of the complex; it has its own entry and forecourt on the side opposite from the hospital. Separate from the hospital buildings except where it touches the hospital church, it is a very visible cubical block with a richly decorated, gilded dome. It is so different from the soldiers' church that, virtually from their construction, almost everyone assumed they were designed by different architects. Jules Hardouin-Mansart was, however, the architect of both, though he developed Bruant's basic plan for the soldiers' church. It was finished fairly rapidly, begun in 1676, and covered by the following summer. Appropriately austere, a church for soldiers, St. Louis is decorated mainly by banners taken in battle, though many (1,400) of them were destroyed in 1814 to avoid being retaken after Napoleon's defeat. The main altar is seen through the opening into the Church of the Dome, where it is located.

The royal Church of the Dome, begun as the hospital church was being finished, is as sumptuous as the soldiers' church is plain. Construction on it was, consequently, slower; it was not substantially complete until 1691, and decorations continued until at least 1706. Its plan contrasts as much as the decoration. The royal church does not have a longitudinal plan, but a circle inscribed in a square. Four circular chapels are inserted between the central space and the corners of the square. The plan is symmetrical about both the cross-axes and the diagonals. Since the volume of solid masonry needed to support the dome almost equals the usable space, the interior gives the impression of having been carved out of a cubical block of masonry.

Hardouin-Mansart's plan was based on an unbuilt design by his great uncle François Mansart for a Bourbon (Louis XIV's family) funeral chapel at **Saint Denis**. It is quite possible that the Church of the Dome was intended as a replacement. The soldiers' church was certainly adequately large as a church for veterans. However, no Bourbons were ever buried at Invalides, so the real purpose remains speculative.

François Mansart's **Val-de-Grâce** in Paris also combines a longitudinal with a centralized plan, but the two spaces in it were unified. The entry facade of the Church of the Dome is, however, also reminiscent of the Val-de-Grâce, and typical in general of Jesuit churches of the period. Hardouin-Mansart made the templelike center the same height as the same plain sides, which emphasizes the unity of the whole facade with the cubical form of the church. The dome also bears a superficial resemblance to that of the Val-de-Grâce, but Hardouin-Mansart uses three nested domes instead of two: There is an inner stone dome with a huge opening in its top that frames a painting

on a middle dome, also stone, and an outer dome of wood covered with lead. (Sir Christopher Wren's contemporary church of St. Paul's in London also has three domes, the middle one built of brick.)

Architects had, since Brunelleschi's dome in Florence, used an inner dome appropriately scaled to the space inside the building and a taller outer one that can be seen better from a distance. The use of three domes is characteristic of *Baroque* architecture. Baroque architects typically liked more complicated spaces and theatrical lighting effects. In the Renaissance, the surface of the inner dome might be painted, but in the sixteenth and seventeenth centuries, it was more typical to frame the paintings by an architectural feature in front of them. In Hardouin-Mansart's church, the inner dome frames the painting on the middle dome, which exists at some distance from the frame and is lit, dramatically, by invisible windows between the two domes. The painting seems to mysteriously float in space, to be part of another world. The outer dome is still there to be seen from a distance and, in contrast to most other domed churches, can be seen even close to the church because of the centralized plan: Other domes are hidden from close up by the naves in front of them. It helps that the dome of the Invalides is one of the highest in the world, its spire about 345 feet above the ground, about the height of a thirty-story skyscraper. Because the nails fixing the lead plates to the outer wooden dome were iron and rusted through relatively quickly, the wood structure soon rotted. The roof has been restored twice. The first time, the iron fasteners were replaced with copper, the second time the thickness of the lead roofing plates was reduced (but they still weigh more than 250 tons). Major decorative features of the dome are gilded. Astonishingly, when the dome was recently regilded, only 6 kilograms, a little over 13 pounds, of gold leaf was needed.

Napoleon's Tomb

Many of the decorations on the inside of the dome, which referred to royalty, had to be reconstructed after their destruction during the French Revolution. Even the main altar was destroyed in the 1790s and replaced by the architect Visconti. He also remodeled the Church of the Dome into Napoleon's tomb. To avoid competing with Jules Hardouin-Mansart's beautifully proportioned interior, Visconti cut a circular hole in the floor, surrounded it with a marble railing, and put the tomb on the floor below. For Napoleon's sarcophagus, Visconti chose porphyry, an extremely rare, dark reddish-purple stone much prized by the ancient Egyptians and Romans. The quarries for porphyry had been exhausted in antiquity, but a new source was discovered in a remote part of Russia. It took more than a year to quarry fifteen blocks, one of which weighed 200 tons, and transport them to Paris. Napoleon's remains, which were transferred to a chapel in the Invalides in 1840 after seven years of negotiations with England, are enclosed in a nesting of six caskets (successively oak, ebony, two of lead, mahogany, and white

iron) within the porphyry sarcophagus. On April 3, 1861, amid much ceremony, what was left of the emperor was transferred from the chapel to the permanent tomb.

The Invalides Today

By 1968, no more than 100 soldiers remained in the Invalides, and the hospital had become primarily a center for treating paraplegics and rehabilitating patients after major surgery. Several museums have also been installed in the Invalides, including one that dates to the construction of the building and displays a collection of models of major fortresses. Other than the creation of Napoleon's tomb in the middle of the nineteenth century, though, the Invalides looks much as it did in Louis XIV's reign.

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ISSOIRE: ABBEY CHURCH OF ST. AUSTREMOINE, AUVERGNE

Style: Romanesque

Dates: Early Twelfth Century, approximately circa 1130–1150

Architect: Unknown

The Auvergne “School” of Romanesque Architecture

In France, only Normandy possesses churches with the same uniformity of style and architectural characteristics as are exhibited by a group of late *Romanesque* churches located within about 30 miles of Clermont-Ferrand, the capital city of the Auvergne. Their uniqueness derives in part from how directly they reflect the geography, climate, and political history of the region; their homogeneity of style resulted from their having been built almost simultaneously. The abbey church at Issoire is probably the best known and most representative of the group that, curiously, was a major influence on the development of American architecture.

Except for Clermont-Ferrand itself, the Auvergne is still a relatively wild and isolated region, with severe winters, that extends across the mountain-



St. Austremoine in Issoire, probably built around 1130–1150, is an example of the unique architectural tradition of the Auvergne, a region on France's central plateau.

ous northern part of the Massif Central, the high plateau in the center of France. Its landscape made it difficult to control when the Western Roman Empire disintegrated, and it broke into many small fiefs that were integrated into the realm of the French king only in the early thirteenth century. The region thus lay outside the major architectural developments of the eleventh century, and these churches were built, without much local precedent, only after the High Romanesque style had been developed elsewhere.

There are scarcely more than a half dozen churches in the group: Notre-Dame-du-Port in Clermont and churches of the former abbeys in the towns of Issoire, Orcival, Saint-Nectaire, Saint-Saturnin, and Mozac. Although much smaller than the *pilgrimage churches* of southwestern France, for example, **Saint Sernin** at Toulouse, the Auvergnat churches are built on the

same *Latin Cross* plan: a long central vessel or *nave* (for the congregation) flanked by narrower, corridor-like side aisles; *transepts* (the short arms of the cross) that extend beyond the aisles; the *choir* and *apse* (the extension of the nave containing the high altar for the monks); and the *crossing* (where transepts, nave, and choir intersect), which is marked by a tower that lets light into the center of the building. In all churches of this type, an *ambulatory* (corridor) curves around the apse and opens onto a series of small chapels containing side altars that radiate from the high altar.

In contrast to the impressively ornamented west (entry) facades of many Medieval churches (for example, **Notre Dame** in Paris, **Chartres Cathedral**, and **Reims Cathedral**), the west or entry facades of the Auvergnat churches are nearly blank stone walls with a door; fine details exposed to the harsh north and west winds, rains, and snow quickly deteriorate. The *chevets* (the exteriors of the east ends) of the churches are correspondingly striking and expressive. They build up in a powerful, pyramidal composition to an octagonal central tower supported on sloping “shoulders” over the transepts and are more or less richly decorated with inlaid patterns of black and white stone and marble reliefs. It is this distinctive and unforgettable silhouette and decoration that inspired the great American architect H. H. Richardson when he designed Trinity Church in Boston (1872–1878), one of the masterpieces of American architecture.

Structurally, the churches are old-fashioned; they display none of the technical experimentation found elsewhere in France during the same period. Both architects and clients seem to have wanted to build solidly and well, again perhaps a result of the rude climate. All of the large Auvergnat churches use the local, yellowish, very dense sandstone for most of the construction. Masonry is, however, exceptionally well crafted for the period, even though construction must have proceeded rapidly. This is especially remarkable because there was no great masonry tradition to build on. Indeed, there are few traces of architecture in the region from before the eighth century, and no complete building from the Carolingian age (the ninth century) survives.

Two factors were responsible for the flowering of culture in the eleventh and twelfth centuries that these churches represent. First, Pope Urban VII had preached the first crusade at Clermont-Ferrand in 1095, partly to redirect the energies of the local feudal lords, who were constantly at war with each other. Second, the relative peace that followed encouraged great numbers of pilgrims to pass through the region on their way to and from Le Puy and, especially, to and from Santiago de Compostela in Spain at the end of the eleventh and beginning of the twelfth century (see **Saint Sernin** at Toulouse). The wealth generated by the pilgrims, who were attracted by the relics of saints in local churches such as St. Austremoine, paid for their reconstruction; the pilgrims may have brought along with them descriptions of churches that they had seen along the route. Some historians think that the prototype for the Auvergnat churches was the ancient cathedral in Cler-

mont, but little is known about it beyond its crypt since it was completely rebuilt in the Gothic style.

St. Austremoine

The abbey church at Issoire is the largest, though by very little, and the most richly decorated example of these churches near Clermont. It was dedicated to St. Austremoine, whose head is the revered relic in the church. He had set out from Rome to convert Gaul to Christianity and became the first bishop of the Roman Province of Arvernia (Auvergne). His body was taken to Volvic at the end of the seventh century, but some parts of him were preserved as relics in the Abbey of Mozac, another of the church group, where his body was moved in the eighth or ninth century. According to legend, his head was taken to Issoire around 900 c.e.—perhaps as late as 940—by Benedictine monks escaping a Norse invasion. There is some speculation that Gilbert, the leader of the Benedictines, established the monastery over a pagan site dedicated to the Egyptian goddess Isis, who was revered by the ancient Romans. (It was not unusual for Christian churches to replace pagan sites as if to annul the power of pagan gods. It is unlikely, as some accounts assert, that the Countess Brayère founded the abbey in 318, since she lived around 1220–1225.) Almost nothing is left of the original monastic buildings around the church, and its west facade is a nineteenth-century reconstruction.

St. Austremoine's Interior

St. Austremoine's interior is a contrast to the austere exterior. Every surface but the floor has been painted; this, too, is part of the nineteenth-century restoration. The restoration by the architects Bravard and Mallay has been heavily criticized because of various changes they made, and A. Dauvegne's and Mayoli's recreation of the painted surfaces has been dismissed as guesswork. Authentic or not, St. Austremoine's interior gives an idea of the colorful nature of Medieval churches (see also **Paris, Sainte-Chapelle**).

St. Austremoine's interior suggests strength and almost primitive power. No details subdivide it in a way that allows its size to be easily grasped: there are no *doubleaux*, the structural stone bands found in similar churches that connect columns across the nave to reinforce the vault; and the walls above the nave arcade are smooth, without the attached columns normally found in Romanesque churches. This immeasurable quality is magnified by the dimness of the interior. Small windows in the outer walls of the gallery let very little light into the nave.

Proportions of the nave, especially the ratio of width to height (the nave is 26 feet wide, 62 feet high, and 213 feet long), are similar in the entire group of churches. St. Austremoine probably had a wooden roof that was replaced with a stone *barrel vault* because of the danger of fire, which destroyed so many Medieval churches (see **Chartres**); but the vault's shape and construction also enhanced the monks' singing. Spiral staircases on either side

of the *narthex* lead up to the galleries above it and the aisles. The aisle galleries open onto the nave through three-lobed openings, shapes characteristic of churches along the pilgrimage routes that were influenced by architecture from Muslim Spain (see **Saint Michel de Cuxa**). The side aisles are comparatively tall for a Romanesque church, and their quarter-circle vaults are critically important supports for the nave vault.

Many *capitals* on the cylindrical columns between nave and side aisles and around the apse were severely damaged during the Wars of Religion (sixteenth-century civil wars between Protestants and Catholics) and were restored or recreated in the nineteenth century. Nevertheless, as an ensemble, they are exceptionally important examples of Romanesque sculpture. Each capital is carved with groups of figures, all of which are brightly painted. Some tell stories from the Bible, but there are also such carvings as an ape-faced figure bound with a rope and mythical animals like centaurs and griffins. One of the oldest capitals in the church, at the crossing, shows a winged demon carrying a damned being off to hell. Opposite, as if for comic relief, a figure carrying a sheep on his shoulders sticks out his tongue with the effort. Capitals on the eight columns that define the curved apse at the east end of the choir have scenes of the Last Supper, the Crucifixion, the Resurrection, and Christ's appearances afterward.

The choir and apse are five steps above the nave and, as in all monastic churches, were originally reserved for the monks and screened off from the nave by a *jube* or rood screen. The celebration of the mass could be seen by the general public in the nave, but they could not directly participate in it.

Stairs on either side of the choir lead down to the crypt, perhaps the finest and purest in Auvergne. Cylindrical *pillars*, connected with broad arches, are arranged in the same simple semicircular pattern as the columns around the apse above, and five chapels radiate in the same pattern as those above and serve as foundations for them. The only decoration in the crypt is the ornament on columns that frame the entries to the chapels, and it is simple in the extreme. A niche in the west wall of the crypt originally contained the relics of St. Austremoine.

Like those of most Romanesque churches (and unlike those of Gothic churches), St. Austremoine's chevet is composed of discrete units that step up to the crossing tower, each one representing a separate area within the church (radiating chapels, the rounded end of the choir, and the outer transepts, whose roofs are the same height as the choir's). In plan, the tower is square, but the architect built small arches across the corners of the square to create an octagonal form that is gradually shaped into a dome that caps it on the interior.

Columns are attached to the rounded exterior walls of the chapels' apses, and geometric patterns of black volcanic stone and white marble are set into the warm, golden sandstone. There are also relief sculptures, medallions containing the signs of the zodiac, inserted into the upper parts of the walls. Since in the Middle Ages the zodiac was related to labors of the months and

the passage of the seasons, it was considered an allusion to time and the stars as works of God. All except one of these relief sculptures (Taurus) is original. The first of the series, on the south transept apsidal chapel, is Aries, representing March, the first month of the Medieval year.

In the aftermath of the Massacre of St. Bartholomew's Day (1572), when tens of thousands of French Protestants were killed, Protestant troops under Captain Merle attacked Issoire in revenge, demolished the church towers, defaced the sculptures on the interior, and killed or tortured numerous monks and priests. Two years later, the Catholic Duke of Anjou, brother of the king of France, retook the city, sacked, and burned it. The church of St. Austremoine suffered a great deal during these attacks, hence the need for the extensive restoration in the nineteenth century.

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JACQUES CŒUR HOUSE, BOURGES

Style: Gothic

Dates: 1444–1451

Architect: possibly Guy de Dammartin

Jacques Cœur had his motto, "To the valiant heart nothing is impossible" ("À vaillants cœurs, riens d'impossible"), carved near the entry to his house. It is a pun on his name—James Heart, in English—and is appropriate for the man who built the largest, most elegant, and most richly ornamented upper-class mansion of the French Middle Ages. He was the only person not of the nobility who was wealthy enough to build such a palatial residence.

Jacques Cœur's house (Palais Jacques Cœur) is both a direct expression and symbol of the owner's literally fabulous life. Born into the merchant class of the city of Bourges, Jacques Cœur was one of King Charles VII's closest advisors by the time he built his house and, wealthier than Charles, had loaned the king the money he needed to take Normandy back from the English and Burgundians. Ironically, or perhaps because of this, he never lived in his sump-



Courtyard of Jacques Cœur's Mansion (Palais Jacques Cœur, 1444–1451) in Bourges. Jacques Cœur was the wealthiest individual in France until his estate was confiscated by the king. His palatial townhouse is the most important example of its type to survive from the French Middle Ages.

tuous house. Shortly before it was finished, he was arrested, thrown into prison, and everything he owned was confiscated. He died soon after.

The Improbable Life of the Richest Man in France

Since Cœur's mansion is so thoroughly an architectural portrait of him and so completely influenced by the traditions of the city in which it was built, a brief sketch of both will help to understand and appreciate it. Bourges, where Cœur was born between 1395 and 1400, had a long tradition as a wealthy and influential city of art. As a Celtic city (Avaric) of about 40,000 inhabitants, it had resisted Caesar's campaigns to take Gaul. Ultimately defeated, it nevertheless retained a remarkable degree of autonomy under Roman rule and became, in the fourth century, the premiere city of the region of Aquitaine. In the Middle Ages, the Duke Jean de Berry, one of the richest and most powerful men in France, made Bourges the capital of his principality, which included the regions of Berry, Auvergne, and Poitou. An astute businessman, he also spent lavishly, and supported a flourishing trade in luxury goods. He commissioned numerous pieces of art, including the famous illustrated manuscript known as the *Très Riches Heures* (by Paul de Limbourg). He also commissioned a number of buildings from the finest architects and craftsmen of the region. Jacques Cœur appears to have used the same builders for his own house.

His wealth came partly from the luxury goods he supplied to the duke's court, but mostly it was a result of his close ties to the duke's successor, who was disparaged as the "King of Bourges" until he entered Paris on November 12, 1437 and became King Charles VII of France. To eliminate Italian and Spanish middlemen from his lucrative trade in luxury goods from the Orient—rugs, pearls, spices, silk, porcelain, perfumes, incense, gold, and dyes—Jacques Cœur rented a galley and, in 1432, went to Damascus and Beirut to establish his own contacts and branch offices. Although shipwrecked and ransomed from local pirates on the voyage, he built his own fleet of galleys to deal directly with the East and reopened the crusader port of **Aigues-Mortes**. It and Montpellier's port proved inadequate, and he moved to the harbor of Marseilles, a city not yet incorporated into France. His empire, which eventually included mines, factories, offices, and warehouses from the Mediterranean to Bruges in modern Belgium, involved him in international banking and diplomacy. Because of his expertise and contacts, King Charles VII made him Master of the Mint, Argentier or Steward of the Royal Expenditures, Banker of the Court, and member of the King's Council. As a diplomat representing France, he was partly responsible for resolving a controversy in the Roman Catholic Church between two competing popes. Perhaps in gratitude, Pope Nicolas V, who had also paid for the huge, stained-glass window in the west facade of Bourges Cathedral, named Jacques Cœur's sixteen-year-old son archbishop of Bourges. In September 1449, in recognition of his son's appointment, Cœur gave a reception in his new house. Construction on it had begun in 1444, though it was still uninhab-

ited, probably because it lacked some of its decorations, in 1451 when he was arrested. Nevertheless, the king's officers described it as "richly furnished."

Charges against Jacques Cœur were undoubtedly exaggerated. Members of the nobility, including the king and queen, owed him considerable sums, and he had foreclosed many estates in Berry. At the end of his trial, which took two years, he was condemned to death. In light of the services he had rendered to France, the king commuted this to banishment for life and imprisonment until he paid a fine—which was greater than the total value of his properties. To escape what was, in effect, a life sentence, he fled to Rome where the pope protected and pardoned him and gave him command of a fleet of ships destined, on the Ninth Crusade, to protect the Christian islands of the Greek archipelago. He became ill on the trip and died on the island of Chios.

Jacques Cœur's Palace as an Expression of His Life

Jacques Cœur's house is as unique as his life. No other private dwelling in France is comparable. Like Bourges Cathedral and the palace of the Duke de Berry (destroyed), the mansion was built at the edge of what had been the Roman city. Roughly half of the 50,000-square-foot site was covered by the house, the rest by a garden. About 100 yards of the ancient Roman walls, including four round defensive towers, are incorporated into the west side of the house. The upper Medieval parts, mostly of cut stone with some plaster, are clearly distinguished from the Roman masonry, alternate courses of small cubic stones and brick. Reuse of the Roman defensive walls and towers gives an austere, fortresslike appearance that is appropriate to the "functional" side, the back of the house. There is a ground-level courtyard, the "low court," where supplies for the house were delivered and where many domestic activities took place. The east side of the house, the entry side, which faced the "high city," is 20 feet higher.

Guillot Trépant, Jacquelin Culon, and one of Jacques Cœur's agents, Pierre Jobert, supervised construction of the house, but the name of the architect is not known. In significant ways—for example, the upper parts of towers and the chapel above the main entry—it resembles the Duke de Berry's castle at Mehun-sur-Yèvre, which is known from the exquisite illustration in the *Trés Riches Heures* of the Duke de Berry. It is therefore likely that the duke's architect, Guy de Dammartin, or his assistant, also designed Jacques Cœur's house, especially since the duke and Jacques Cœur were closely associated when the house was begun.

Simultaneously Practical and Luxurious

Both the interior courtyard and the exterior of the mansion are pentagonal in plan, another consequence of using part of the Roman walls: The angle of the west side of the building corresponds to an angle in the ancient wall. Other aspects of the plan follow directly from accommodating separate formal reception, private family, and domestic service functions of the mansion in the most practical, rational, and ingenious fashion. For the most part, ac-

cess to the different functional parts was through separate entries and staircases from the internal courtyard. Unusual for houses of the period, comfort was a high priority.

There are two doorways from the street to the central courtyard: a large one for carriages and a smaller pedestrian or postern gate next to it. Portrait statues of Jacques Cœur and his wife in false windows above these doors seem to greet visitors. There was an equestrian statue of Charles VII in a niche between the windows, but it was destroyed during the French Revolution. Above the niche is the large window behind the altar in the palace chapel. Its *Flamboyant tracery* forms a *fleur-de-lys* (stylized lily), a symbol of the French crown, and hearts (for Jacques Cœur and his wife). The significance of combining symbols of the owners and the king would have been lost on no one. Scallop shells, the Medieval symbol of St. Jacques (St. James), and hearts are prominent in decorations throughout the house.

Upon entering the court, the most decorated part of the mansion, the visitor faces the main residential block, the *corps-de-logis*. The main stairway to the reception halls is in the center tower, a variation of the central tower of the west facade decorated with delightful sculptures of Jacques Cœur and his wife, visitors to the palace, and exotic peoples and plants he had met on his travels. In the tower in the northwest corner of the court are stairs up to the private and service quarters and down to the lower service court. Sculptures on this tower are, therefore, of domestic scenes. On the ground floor, the three sides of the interior courtyard opposite and adjacent to the *corps-de-logis* are open galleries. At one time thought to have been used for commercial operations, they are now generally believed to have served social functions in the summer. Closed galleries that had fireplaces, according to the same reasoning, were used for social gatherings in the winter. Sizes and placement of windows on all the facades correspond to the rooms behind them rather than, as is frequently the case in Renaissance buildings, to a preconceived geometric pattern. There are few windows on the street facade of the ground floor; while the chapel and reception halls have very large windows, the service rooms (kitchen, pantry, warming room, etc.) have small windows.

The interior of the house gives an idea of the luxury possible in the fifteenth century. Public rooms were large and magnificently decorated. Though many of the original decorations were destroyed over the centuries, especially when the building was used for courts (the present decorations are conjectural reconstructions), the sizes and relationships of the rooms are intact. The dining/festival hall was on the ground floor of the residential wing to the left of the main stair tower; it takes up the entire width of the wing. There is a musicians' gallery at one end of the room and at the other an immense fireplace. Its top, which resembles the battlements of a castle, was reconstructed from a few fragments found during restoration. According to a 1636 inventory, the windows in the hall were originally filled with thirty stained-glass panels, but none survive. Several staircases, in addition to the ceremonial main stairs, connect the dining

room with the less-public areas above, the storerooms and wine cellar below, and the kitchens in the northwest corner of the house. Above the festival/dining hall was a huge room of the same size for family gatherings. On the same floor, on the other side of the main staircase, were private rooms for Jacques Cœur and his wife, with an office between them. His room originally had stained-glass windows showing his fleet of galleys; one of them, heavily restored, survives. Another galley is depicted in a relief sculpture above a doorway. These rooms interconnect through doors on the courtyard side and by a more private corridor on the west side that connects with the central tower of the west facade. On the top floor of this tower, the equivalent to the *donjon* or keep of a castle, was the house's strong room, and on the roof, a viewing platform.

Above the family rooms was an immense attic covered by wood trusses. Because of the trusses, there are no intermediate walls. The use of this large space is uncertain, but it served as more than a mere attic. Below the family rooms were bathing facilities and a sauna, both cleverly heated. They were served by their own stairs to maintain privacy. Since these facilities for personal hygiene were not typical of private houses or even princely dwellings in Europe at that time, they are probably features that Jacques Cœur saw on his travels to the East and brought back with him.

Though much restored in the nineteenth century, the chapel has suffered the least. It was divided into two floors and turned into a library when the Jacques Cœur Palace was remodeled into a court house. The intermediate floor probably saved the colorful ceiling, which is painted with a series of angels holding banners inscribed with verses from the *Song of Songs*.

The Palace after Jacques Cœur

Jacques Cœur's house and its furnishings were confiscated upon his arrest, but the house was given back to his sons in 1457. His grandson, who did not live in Bourges, sold it to a wealthy local family in 1507, who used it as their family mansion. Louis XIV's minister of state, Colbert, bought it in 1679, but sold it three years later to the city of Bourges, which used it first for the city council and then as a court building. Until then, the house was maintained in relatively good condition, but the city enlarged windows or created new ones, blocked up the ground-floor arcades to create offices, partitioned larger rooms into smaller ones, and destroyed nearly all the interior decorations, including all the huge, richly carved fireplaces. The designation "palace," ironically, is from this time.

Restoration of the street facade was begun in 1840, immediately after the building became one of the first to be designated a national monument. Between 1860 and 1870, during a second campaign, the architect Auguste Baily restored the chapel and the galleries. He removed the floors and partitions that had been added and "imaginatively" restored many of the sculptural and painted details, though the restorations, such as the lower walls in the chapel, exhibit more mid-nineteenth-century taste than mid fifteenth-century prac-

tice. He also demolished the Hôtel de Limoges, a mansion that had been added to the palace in the sixteenth century by the new owners. Around 1885, a third campaign restored the west facade and the Roman walls below it. Much of the sculptural decoration and some of the architectural features were carefully restored between 1923, when the state bought the house, and the eve of World War II.

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LES HALLES (CENTRAL MARKETS), PARIS

Style: Early Modern Industrial

Dates: 1854–1857 and 1860–1866; demolished 1973

Architects: Victor Baltard (1805–1874) and
Félix Callet (1791–1855)

A Masterpiece of Iron Construction

Les Halles, the central markets of Paris, were a masterpiece of iron construction, unprecedented in the extent to which this material had been used in France. In size and detail, they rivaled (quite intentionally) the Crystal Palace, the first huge, all-iron-and-glass structure that had been built in London for the Great Exposition in 1851. The destruction of Les Halles in 1973 was unexplainable cultural vandalism.

The Old Central Markets Become Inadequate

Since the twelfth century, all foodstuffs—meat, fish, vegetables—were brought to a single, central wholesale market and redistributed to the neighborhoods from there. (Wine was stored in a separate central warehouse.) At first, the market was outside Paris's defensive walls, but Philip Augustus moved the city walls further out, and in 1183, he had the first permanent structures built for the markets, now within the walls. These Medieval markets were repeatedly added onto as the city grew. Napoleon I had proposed replacing this hodgepodge of building with one large hall in 1811, but noth-



Les Halles, Paris' central markets (1854–1857 and 1860–1866) by Victor Baltard and Félix Callet, were the outstanding examples of French cast-iron architecture. Their demolition in 1973 was a major act of architectural vandalism.

ing was done. By 1842 rebuilding markets for a rapidly growing city had become urgent.

The First Project

In 1844, the government requested a proposal from Victor Baltard, who in 1833 had won the Prix de Rome, the most prestigious architectural award in France. He and Félix-Emmanuel Callet were named “architects of Les Halles” in 1845, and they prepared a scheme for rebuilding the markets on the old site. For a while, because of political unrest, nothing was built, but in 1851, Napoleon III laid the cornerstone for the first unit of their scheme. It was unattractive and unsatisfactory for several reasons. Baltard was a relatively conservative architect, whose main building experience was the restoration of churches. He and Callet designed a correspondingly conservative stone pavilion with an iron roof structure.

It was nearly finished in 1853, when the emperor ordered it demolished. Napoleon III had, in the meantime, seen the Crystal Palace and considered schemes for constructing the markets in iron by other architects and engineers, especially proposals by Hector Horeau, who had competed for the design of the Crystal Palace, and Eugène Flachet. A competition was held to find a new architect for the markets. Napoleon III's prefect, Baron Haussmann, stated that the emperor wanted the buildings to be built of “iron, iron,

nothing but iron.” He wanted “nothing more than umbrellas,” like the great iron train sheds of the period.

The Competition

The rules for the competition stipulated functional but not aesthetic requirements. The new markets were to provide the food stands with protection from weather, to be well ventilated, and to be clearly arranged to facilitate smooth access of traffic. The markets had to be capable of being expanded over time, which implied a standardized plan and standardized construction elements. Forty schemes were submitted. All were rejected for violating one or more of these stipulations; Flachat’s, for example, because he proposed one, large universal space that was difficult to organize. Hector Horeau’s scheme was rejected because he had proposed a different site that would have involved the additional expense of acquiring the land. In the end, a new scheme by Baltard and Callet was chosen. Some competitors claimed that the two had stolen their ideas.

Baltard and Callet’s new scheme was for an eventual group of twelve squarish pavilions separated from each other by covered streets. These pavilions were to be arranged in pairs on either side of a longitudinal street; a transverse, central street divided the site in half in the other direction. Pavilions were identical, mass-produced from prefabricated cast-iron parts. Pyramidal roofs stepped up in three stages above a cubical base. Some openings in the iron structural frame were filled with ceramic panels, others with louvers that kept out rain but permitted circulation of air and natural lighting, and most on the ground level were left open. Lit up from within at night, the pavilions looked like a collection of huge Chinese lanterns. The site covered 960,000 square feet (the Crystal Palace covered 830,000 square feet).

The first two pavilions were inaugurated in 1854, a year after the competition, demonstrating how quickly one could build with the new construction techniques in iron. Callet died in 1855, leaving Baltard in full charge. Four more pavilions were added in 1858, four others in 1860 and 1874. The last two pavilions were not built (with some modifications) until 1935. By then, the markets were not only too small, but also there was no more room for expansion. Even more critical, the city had grown so huge and was so dense, it was difficult to get trucks to the site to supply the markets. Consequently, in 1962, a decision was made to move the central markets to Rungis, near Orly Airport, south of Paris. Functional but deadly dull buildings at Rungis opened in 1969.

After Les Halles

Some of the pavilions were still used for local markets until 1971, and others adapted as theaters and exposition spaces. The day and night activity in the markets had, for centuries, made Les Halles a lively neighborhood,

which it remained with the new uses for the pavilions. Some of the activities, the subject of the classic movie *Irma la Douce*, were considered undesirable by the authorities and the real estate value of the land suggested redevelopment to them. In 1973, in the face of intense international protest, Baltard's pavilions were demolished. Only one was saved and reerected in Nogent-sur-Marne, east of Paris, but the reconstruction barely resembles the original.

The site remained a very deep hole for several years because of a vast new subway station that was constructed under it. What to build above this hole remained a lively controversy for more than a decade. President Pompidou wanted to follow up on the immense library and art museum, now called **Pompidou Center**, that was under construction to the east of Les Halles on its former truck parking lot. He proposed that a group of skyscrapers be built as a world trade center in place of Les Halles. One of the first acts of Pompidou's successor as president, Giscard d'Estaing, was to cancel that project. Why have another New York instead of a unique Paris, he wondered.

Ultimately, a vast underground shopping mall, the Forum des Halles, was built at the east end of the site, designed by Claude Vasconi and Georges Pencreac'h in 1979. Above it, a particularly ugly series of buildings by Jean Willerval was added in 1982. The west end of the site is more successful. Paul Chémétov designed underground public facilities (cinemas, a swimming pool, and a greenhouse, among other things), which were finished in 1985, and Claude and François-Xavier Lalanne designed a large park in 1987 for the surface above them. In 2004, the city of Paris held a competition to rebuild the entire site with something more appropriate.

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LOUVRE AND TUILERIES GARDEN, PARIS

Medieval Louvre

Style: Medieval

Dates: 1190–1202

Architect: Unknown

Renaissance Louvre

Style: Renaissance

Dates: 1546–1654

Architects: Pierre Lescot (1515–1578), Jacques Lemercier (1585–1654), and others

Neoclassical Louvre

Style: Neoclassical

Dates: 1654–1678

Architects: Louis Le Vau (1612–1670), Claude Perrault (1613–1688), and others

Nineteenth- and Twentieth-Century Louvre

Style: Modern

Dates: 1804–1880 and 1982–

Architects: Pierre-François-Léonard Fontaine (1762–1853), and Charles Percier (1764–1838); Hector-Martin Lefuel (1810–1880); I. M. Pei (1917–)

To most people, the Louvre is a huge museum exhibiting famous paintings and sculptures like the *Mona Lisa* and the *Venus de Milo*, but for centuries it was the residence of the kings of France, one of the largest palaces ever built. It embodies the history of France, both political and architectural, from the year 1000 to the present. The original Louvre, a Medieval castle, was demolished and rebuilt by succession of great architects and was added to, restored, and reconfigured many times. As a result, it is an assortment of many architectural styles, and difficult to grasp as a whole. Parts vary in qual-

ity. Sections of the main courtyard are among the most accomplished pieces of Renaissance architecture in France, and the East Facade, the “Colonnade,” is a masterpiece of French architecture that marked a dramatic change in the direction of architectural design and theory. Some sections added during the nineteenth century are less significant.

The Four Main Parts of the Louvre

Of the four main parts of the Louvre, the square block that faces the center of Paris is the most important. Its East Facade is the ceremonial entry to the palace, and the Medieval Louvre occupied what is now the southwest quadrant of the Cour Carrée (Square Courtyard) within the east block. From its southwest corner, the Grand Gallery extends a third of a mile along the Seine River. It was originally just a corridor connecting the old Louvre (which was within city walls that had been moved further west) with a new residential wing outside the walls. The Grand Gallery was expanded several times and was the first part of the Louvre turned into a museum. The new wing at the end of the gallery, the Tuileries Palace, that originally extended north from the end of the Grand Gallery to what is now the rue de Rivoli was burned in a riot in the late nineteenth century. The fourth section, similar to the Grand Gallery, was built in the nineteenth century to connect the north end of the Tuileries Palace to the northwest corner of the Cour Carrée. It was this sprawling, discontinuous mix of buildings that President



The East Facade (Colonnade) of the Louvre, designed by a committee of French architects headed by Claude Perrault, was the basis for French classicism and his theory of architecture, written in conjunction with his design, was the basis of French architectural theory for much of the next two centuries.

François Mitterrand, in the 1980s, asked I. M. Pei to remodel into a coherent museum.

The Medieval Louvre

In 1190, King Philip Augustus (r. 1180–1223) ordered a castle built at the point in Paris's defenses where the Normans and the English would most likely attack the city. Since the king felt threatened nearly as much by the citizens of Paris, he ordered the castle built just *outside* the city walls. The site, on the north side of the Seine River (the right bank) where it passed through the western walls of Paris, was called the "Louvre," a word that may derive from "louveterie" (place where dogs were trained to chase wolves) or from the Frankish or Saxon word *Lower* (a fortified place).

Only vestiges (the foundations) of Philip's castle still exist, under the Cour Carrée. It was a nearly square enclosure (255 feet by 236 feet) that surrounded the *donjon* or keep, a huge, cylindrical stone tower, 50 feet in diameter and 100 feet high (equivalent to a ten-story building), with 13-foot-thick walls and a tall, conical roof. Much taller than the surrounding walls, the donjon was visible from a distance, the symbol of the king's presence. Ten towers were spaced along the outer enclosure walls: single cylindrical towers at the corners and pairs of semicylindrical towers at the midpoints of the sides. On the east (city) and south (river) sides, these towers defended the main entrances to the inner courtyard. A wet moat surrounded the castle and a dry moat surrounded the donjon, which, as the most secure part of the castle, was the ideal place to keep both the royal treasury and prisoners. Though there were rooms for the royal family and some of their courtiers within the outer walls, the Capetian kings, including Philip Augustus, rarely lived in the Louvre. The Valois dynasty turned the entire fortress into a prison and courtrooms. When Charles V moved the city walls to accommodate the expanding city, the Louvre lost its strategic location and was turned into a pleasure palace, the "pretty Louvre" (*joli Louvre*) that is shown in the famous illustration in the *Très Riches Heures* of the Duc de Berry. After (or because of) the English occupation of Paris (1420–1426), the royal family preferred to live in the Loire Valley. When King François (Francis) I (1494–1547) moved the capital back to Paris, he ordered the old Louvre replaced by a modern palace designed according to the fashionable architecture he had seen in Italy and introduced at Blois and **Chambord**.

The Renaissance Louvre

François, who preferred living at **Fontainebleau**, at first (1529) had only the donjon torn down, but the year before he died, after having rejected a project by the famous Italian architect Sebastiano Serlio (see **Ancy-le-Franc**), he chose Pierre Lescot (1515–1578), an amateur architect, to prepare designs for replacing the entire castle. By the time François's son, Henri II, decided to proceed with the project, Lescot had mastered the "antique" (Renaissance) style of architecture. Lescot, aided by the sculptor Jean Gou-

jon, who contributed at the very least some superb sculptural decoration, directed construction until 1578.

He first replaced the west wing of the Medieval Louvre with a section that now forms the south half of the Cour Carrée's west side. He modified the design several times during construction (1546–1568), moving the staircase from a *pavilion* (a projecting segment) in the center of the wing to a new pavilion at the north end in order to create larger (but fewer) rooms. To maintain symmetry, he built an identical pavilion at the south (river) end, and from it he extended a wing to replace the south side of the castle. Lescot created, about 1551, the first *Mansard roofs* (roofs with a steep lower slope and a shallow upper slope) for these wings.

Even though Lescot had never been to Italy to see authentic Italian Renaissance buildings, his architectural details are as accomplished as those in Italy and better than comparable details of Italian architects working in France. He must have consulted books and may have visited Roman ruins in southern France (**Orange** or **Nîmes**, for example), but it is also possible that the French queen, Catherine de' Medici, brought someone from her home city of Florence to assist or advise Lescot. However authentically Italian the details in Lescot's facade, it is distinctly French in overall effect, far less monumental and grand than Italian Renaissance buildings. Lescot emphasized surface, not mass or volume, and he used more and finer detail to subdivide the facade into smaller parts.

At some point, Lescot prepared the *Grand Dessein* (Grand Design), which would be the basis for work for the next three centuries. He proposed quadrupling the area taken up by the Medieval Louvre by doubling the length of his two new facades and then doubling the resultant facades, suggesting the Cour Carrée. Lescot also proposed extending the Louvre to the west (past the city walls) with north and south wings and connecting their ends with a new palace. Some of his ideas may have come from a plan by Serlio, and François I's mother, the Duchess of Savoye, had suggested building a new palace on a site outside the walls called the "Tuileries" because of brick and tile (*tuile*) factories.

The Tuileries Palace and the Grand Gallery

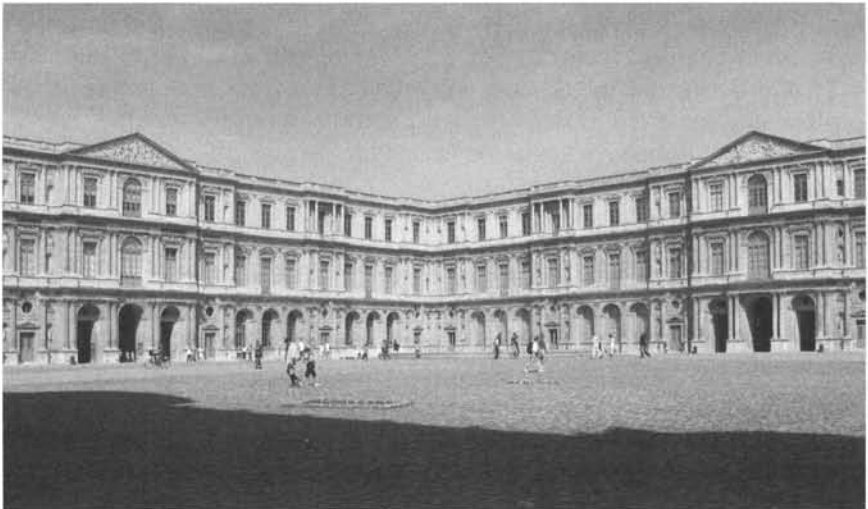
Catherine de' Medici, wife of Henri II, eventually commissioned the Tuileries Palace from Philibert Delorme (also spelled de L'Orme), the architect of **Anet**. Only a small part of his ambitious project, begun in 1564, was built. Over the next decades, several well-known French architects (Jean Bullant and Jacques du Cerceau, among others) developed and extended it. The Grand Gallery, connecting the Tuileries Palace to the Louvre, was built from 1595 or 1596 to 1606, during the reign of Henri IV. For a long time, it was little more than a long, enclosed hallway along the Seine; as a child, Louis XIII used it for racing his pet camel. Its eastern half, designed by Louis Métezeau and built on parts of the old city wall, is the only section of the original gallery that still exists, and it was heavily restored in the nineteenth

century. Hector-Martin Lefuel replaced the western half of the gallery, designed by Jacques II Androuet du Cerceau, in the nineteenth century.

French rulers preferred the Tuileries Palace to the rest of the Louvre for the next two and a half centuries and constantly remodeled it. In 1659, Cardinal Mazarin commissioned Louis Le Vau to build a 6,000-seat theater in a part of it, then apartments for the royal family and state rooms, including a throne room for Louis XIV, who nevertheless moved to **Versailles**. Louis XV moved back to the Tuileries Palace in 1715 and received Peter the Great there in 1717, but he, too, abandoned the Tuileries for Versailles (in 1722) and allowed artists and other privileged people to live in it. During the French Revolution, on October 6, 1790, King Louis XVI and the royal family were taken as prisoners to the Tuileries. Napoleon and other monarchs lived in the Tuileries Palace in the early nineteenth century, but on the night of May 23–24, 1871, the communards burned it and part of the Grand Gallery. The Pavilion de Flore (the end of the Tuileries Palace) and the end of the Grand Gallery were restored, but the ruins of the Tuileries Palace were demolished. This opened the view from the Cour Carrée all the way to the **Arc de Triomphe**. Of Catherine de' Medici's great contributions to the Louvre, only the gardens she had laid out to the west of her palace, the Jardin des Tuileries, survive, and they were entirely reshaped by Andre Le Notre, the genius who designed the gardens at **Vaux-le-Vicomte** and Versailles.

The Beginning of French Classicism

As soon as he entered Paris in March 1594, King Henri IV proposed many improvements for the city, including the **Place des Vosges**, the Place Dauphine, and the completion of Lescot's Grand Design. Only the city



View of the northeast corner of the Cour Carrée, Louvre, Paris.

squares and the Grand Gallery were built during his reign (1589–1610). After his assassination in 1610, construction on the Louvre was sporadic. His queen, Marie de' Medici, remodeled the apartments in the south wing and moved into them when her eleven-year-old son, Louis XIII, was engaged to Anne of Austria. She also had the Palais du Luxembourg built and lived there until, involved in a series of failed coups d'état against her son, she was placed under house arrest in the Louvre and then exiled to Blois. (Upon her reconciliation with the king in 1620, she moved back to the Louvre and the Luxembourg palace, but was permanently exiled in 1630.) Not until 1624 did Louis XIII commission Jacques Lemercier to execute Lescot's plan for the Cour Carrée. He demolished the north wing of the Medieval castle and extended Lescot's wing, connecting the two with the Pavillon de l'Horloge (now the Pavillon Sully). This side of the Cour Carrée became the model for the remaining sides as they were added. Upon Louis XIII's death, the young king, Louis XIV, and his mother, Anne of Austria, abandoned the Louvre for the Palais Royal, returning to the Louvre only in 1652.

The Louvre under Louis XIV: Architecture as a Political Statement

Louis Le Vau, Louis XIV's architect, finished the north side of the Cour Carrée, then modified Lescot's design for the south wing to receive more sun and have better views. Apartments were created on the ground floor for the queen mother and on the second floor for the reigning queen. He also rebuilt a gallery that had burned in 1661. It connected the southwest corner of the Cour Carrée with the Grand Gallery. This gallery, the Galerie d'Apollon, decorated by Charles Le Brun from 1664 to 1680, is a predecessor to the somewhat later and more famous Hall of Mirrors at Versailles by Jules Hardouin-Mansart and Le Brun. Restored by the architect Duban between 1848 and 1851, Le Vau's gallery remains one of the most important interiors of the modern Louvre.

In his south (river) facade, largely complete by 1663, Le Vau violated strict rules of classicism by introducing six columns that rose through two stories (instead of the customary one at a time), and was severely criticized. He defended his multistory "colossal order," saying it gave the residential wing greater importance than the rest of the Louvre. Ironically, though his entire facade disappeared five years later when the wing was again remodeled, his colossal order became an accepted part of French architectural practice and reappears in the celebrated East Facade.

By 1664, the Renaissance Louvre had replaced almost all of the rough, defensive masonry of the Medieval Louvre. Only the east wing of the Cour Carrée remained to be built. Louis XIV's chief advisor, Colbert, realized the symbolic importance that the ceremonial facade had for the city, and he ordered what remained of the Medieval Louvre demolished. Le Vau designed the new wing, but foundations had scarcely reached ground level when Colbert gave the order to stop construction. He did not like Le Vau, who had designed Vaux-le-Vicomte for his former rival, Fouquet, but he also realized

that Le Vau's design was mediocre. He asked for alternative designs from other Parisian architects, but neither he nor the king found any of them acceptable. François Mansart, the most important French architect of the century (see **Maisons**), was then given the commission. Though he produced a series of brilliant schemes, he could not commit to one, and reluctantly Colbert fired him. Next, Colbert requested proposals from several famous Italian architects. All the French architects were insulted by this move—no doubt Colbert's intention.

Colbert and the king rejected the Italians' designs, too, but on April 11, 1665, Colbert nevertheless invited one of the architects, Gianlorenzo Bernini (1598–1680), to come to Paris. Bernini was both immensely wealthy and the most famous sculptor and architect in Europe; he was also relatively old. He did not want to leave Rome, where he was directing construction of his design for the great piazza in front of St. Peter's Basilica, but at last he agreed—or was forced—to go to Paris for several months. He was paid handsomely and treated like visiting royalty, but everyone except the king found fault with Bernini's new schemes, which was not surprising since Bernini found fault with everything French except François Mansart's Chateau at **Maisons**. The king, however, accepted Bernini's third design, laid the foundation stone, and sent Bernini off with magnificent presents. As soon as Bernini was out of sight, Colbert again halted construction and put Claude Perrault, a medical doctor and scholar who had little experience with architecture, in charge of a committee to produce a new design. Not coincidentally, Perrault's brother was in charge of all royal building.

Perrault's exact role on the committee remains controversial, but its design set a new standard for French architecture. Since the other two members of the committee, Le Vau and Charles Le Brun (the court painter), were preoccupied with building Versailles, Dr. Perrault appears by default to have been largely responsible for the final design of the East Facade, which was based on an earlier, rejected design by Louis Le Vau's brother, François.

Perrault's architectural theory, based on the philosophical principles of René Descartes, whom he greatly admired, is nearly as important as the facade design itself. By imposing a rigorous mathematical organizing system on architectural design, he reduced or eliminated what he felt to be the arbitrary decisions of architects. His approach certainly eliminated the last traces of Medieval practice in French architecture—vertical proportions, tall pavilions, high-pitched roofs, surface and high attic stories. His design retained, however, the characteristically French subdivision of the facade into three parts by projecting pavilions.

The Basis of French Classicism

Perrault's elegant facade is the first French building that rejects the traditional steeply pitched French roof for an apparently flat skyline (perhaps Bernini's influence; the roof slope is so low that the roof is invisible from the ground). Only the triangular *pediment* over the central entry pavilion breaks

the horizontal skyline of the facade. A *colonnade* of two-story, freestanding pairs of columns that extends across the entire facade is its defining feature. Although criticized by contemporary architects, the East Facade became the basis for French classicism, and variations on it appear in innumerable buildings, both in France (the **Place de la Concorde** and the **Paris Opera**) and in the United States (especially in Washington, D.C.). Other than the colonnade's classical columns and the central pavilion, which is a diagram of a classical temple (such as the **Maison Carrée, Nîmes**), references to historical architecture are abstract. The two end pavilions are related to Roman triumphal arches, but only distantly.

Construction on Perrault's colonnade was begun in 1667. He designed ingenious machines to lift two large, thin stones, unprecedented in their combination of extreme length, thinness, and weight (each is 55 feet long, 12 feet thick, 82 feet wide, and weighs around 80,000 pounds), to form the diagonal tops of the central pediment. Perrault's construction machinery was considered at the time as great or even greater a marvel than the design of the facade. Nearly three years were involved in the whole process. Wrought-iron reinforcing, embedded in the masonry, anticipates the reinforcing in modern concrete. After Louis XIV abandoned Paris for Versailles, work on the Louvre stopped. Parts of it had no roof until early in the nineteenth century, and decoration of the facade was finished only in the mid-1800s during the Second Empire.

The Nineteenth-Century Louvre

Louis's departure from Paris also meant that Bernini's plans for a large square in front of the palace—he had proposed razing everything east of the Louvre, including the church of St-Germain-l'Auxerrois, up to the Pont Neuf—were given up, saving an entire city quarter from demolition. It may be that the impossibility of carrying out this grandiose scheme, which included an avenue from the Louvre to the eastern edge of Paris, was part of the reason Louis left Paris for Versailles, where he could create something even grander. People were allowed to build houses up to the facade itself, and various academies, including the Academy of Architecture, moved into rooms around the Cour Carrée. Noble families took over the royal apartments in the south wing, remodeled them, and sent the bills to the government. Only Louis XIV's mother's apartments were forbidden to the parasites. The Cour Carrée itself was filled with temporary buildings, some of which housed workshops for sculptors (and some housed prostitutes). Artists took over other parts of the Louvre as their home. Van Loo, a painter, established his studio and apartment in the Gallery of Apollo.

By the mid-1700s, classicism had become fashionable again, and the Marquis de Marigny, superintendent of buildings for the crown and brother of Louis XV's mistress, the Marquise de Pompadour, persuaded the king to restore the Louvre, especially Perrault's facade. Money was appropriated in 1755, and within two years, the Cour Carrée side of the East Facade was re-

stored, the temporary structures in the courtyard were cleared out, and the houses between the Louvre and the church of St-Germain-l'Auxerrois bought and demolished. Lack of funds slowed work after 1758; it stopped completely even before the French Revolution. Most of the sculpted decoration was not finished until 1807–1811, during the First Empire, and the square in front of the East Facade was not completed until after the Second Empire.

The Louvre as a Museum

Colbert was probably the first person to have conceived a museum in the modern sense. He created a “cabinet des tableaux du Roi” (collection of the king’s paintings) by combining paintings he bought from Cardinal Mazarin and the banker Jabach with paintings that the kings François I and Charles VIII had brought back from their Italian campaigns. In 1786, Louis XVI approved Marigny’s project to install a collection of the king’s paintings, prints, medals, and “curiosities” in the Grand Gallery, but lack of money and the French Revolution prevented its execution. It was the revolutionaries’ desire to make Paris a center of learning for the whole world that finally brought into being the Musée de la République, which they opened in 1793.

Napoleon enlarged the collection with paintings and statues that he and his troops confiscated, including some from the papal collection. (Most, including the Laocoön, were returned to their owners after Waterloo.) On November 9, 1800, Napoleon and Josephine inaugurated the expanded museum, which was renamed the Musée Napoléon in 1803. Vivian de Non, a scientist who accompanied Napoleon on the Egyptian campaign, was the first director general of the new museum. One of the four main wings of today’s museum is named for him, de Non having been “democratized” to Denon.

Napoleon’s favorite architects, Percier and Fontaine, replaced all of the top floors around the Cour Carrée (except Lescot’s) with floors identical to the court side of Perrault’s East Facade. In 1807, they modified niches in the East Facade back into the windows originally intended, and in 1809, they created a throne room for Napoleon at the center of the Colonnade. A section in the south wing next to the Musée Napoléon was turned into an apartment for the empress. The project for an avenue from the East Facade to the edge of Paris was revived and abandoned.

Several other proposals for new streets were carried out. To create the rue du Carrousel (1802), which connected Lescot’s Pavillon de l’Horloge with the Tuileries Palace, many of the houses and other buildings that still existed between it and the Cour Carrée were demolished. Percier and Fontaine built the Arc de Triomphe du Carrousel (the Carrousel Triumphal Arch) on this new street from 1806 to 1808, using columns of red and white marble from the royal chateau of Meudon, which had been destroyed in the Revolution.

Napoleon decided to carry out an earlier proposal to create a straight street that began at the Place de la Concorde and continued past the east block of the Louvre. Along it, the rue de Rivoli, he commissioned Percier

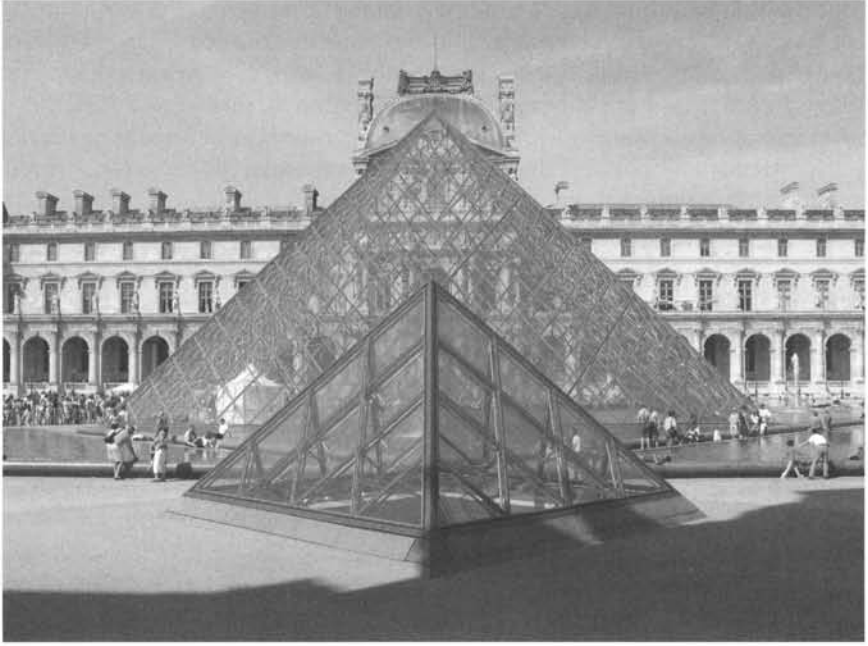
and Fontaine to build a mirror image of the Grand Gallery. An entire neighborhood, including a street from which an assassination attempt was made on Napoleon, was demolished. Percier and Fontaine also designed facades of apartment buildings along the north side of the rue de Rivoli, facing the new wing, that defined the elegant, cool, neoclassical Empire Style.

The same architects had proposed a cross-wing between the Grand Gallery and the new north wing that would have hidden many of the Louvre's irregularities, but Napoleon rejected it. He did not want to cut up the large, open space. Louis Visconti and Emile Trelat later doubled the width of much of the north gallery and the Grand Gallery, and after Visconti's death in 1853, Hector-Martin Lefuel, architect of the Louvre for twenty-seven years (1854–1880), carried out the last part of Lescot's Grand Design, the Pavillon de Rohan. He also rebuilt the Pavillon de Flore after the burning of the Tuileries Palace in 1871, and constructed the symmetrical Pavillon de Marsan along the rue de Rivoli. Unfortunately, he also rebuilt the west side of the Lescot/Lemercier wing, the facade that today faces Pei's glass pyramid, supercharging it with decoration and "systematizing" it; that is, he regularized the windows. With the demolition of the Tuileries Palace after the fire, this is the facade now visible from the Tuileries Gardens.

The Louvre in the Twentieth Century: "The Grand Louvre" and the Pyramid

In 1964, the East Facade, which had become smoke-blackened, was cleaned and the dry moat in front of it, which had been filled in at the end of the seventeenth century, was dug out and restored. In 1981, President François Mitterrand charged the Chinese-American architect Ieoh Ming Pei to correct what had become a very incoherent museum. Lighting was poor, and despite—or because of—the size and shape of the building, it was so chaotically organized that a large part of the collection was in storage. The numerous entries to the museum and discontinuous corridors confused and discouraged the casual visitor. Pei's brilliant solution was to create a central, easily found public entry, a large lobby from which visitors could be dispersed in four clearly marked directions. He also proposed incorporating the nineteenth-century northern wing occupied by the Ministry of Finance into the museum so that circulation through the museum could be continuous, with clear paths and connecting stairways, escalators, and elevators.

Pei's ideas for reorganizing the museum were widely praised (except by the Finance Ministry), particularly his proposal for a single main entry. But his design for the pavilion to mark it, a large glass pyramid in the middle of the Cour Napoleon, the large open space directly to the west of the Cour Carrée, was attacked as inconsistent with the rest of the building. He arrived at the pyramidal form only after long study, concluding that only a styleless geometric shape would not visually compete with such an eclectic collection of buildings as those around the Cour Napoleon. Pei also felt that the py-



The pyramid at the cross axis of the Louvre in Paris.

ramidal form would allow maximum views of the old facades, both from ground level and from below it, where a central entry lobby and its support facilities (rest rooms, ticket windows, storage rooms, etc.) were constructed. They required so much space that the only logical place to put them, Pei argued, was underground, and his glass pyramid not only provided visual identification from a distance and contact with the old palace, but also permitted the lobby to be flooded with natural light. Pei's solution won over most Parisians and visitors almost immediately once it was finished.

Pei's pyramid is huge, a 112-foot square base, 69 feet high. It is built entirely of glass panels supported by a gossamer, nearly invisible, system of wires and connections based on the rigging of yachts. Pei felt it was essential that the glass be not only clear, but also water-white in order to make the pyramid as transparent as possible. All existing glass of the required thickness (several inches) looked green, however. The Saint-Gobain glass company, the same company that had created the unprecedentedly large mirrors for the Hall of Mirrors at Versailles 300 years earlier, produced the required glass after years of research.

Eventually, the Ministry of Finance moved to a spectacular new building in the east of Paris, and its former quarters, a warren of small offices arranged around two interior courtyards, was gutted. Michel Macary and I. M. Pei's

office redesigned these spaces as the Richelieu Wing by joining two internal courtyards, formerly parking lots, underground and roofing them with glass skylights. Escalators dramatically take visitors to top-lit painting galleries on the top floor. Macary and Pei also collaborated on an underground complex of luxury shops, fashion showrooms, meeting rooms, and a parking garage to the west of the glass pyramid, all arranged on either side of a wide corridor that follows the line of Napoleon's rue du Carrousel. An inverted glass pyramid, designed by Pei and lit from above, is the focal point of these facilities. Though extremely popular with the public, some French critics have thought this commercialism incompatible with the Louvre as a high cultural institution.

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MADELEINE, PARIS

Style: Neoclassical

Dates: 1807–1842

Architect: Pierre Vignon (1763–1828)

The church of the Madeleine (Church of Saint Mary Magdalene) is one of the most prominent buildings in Paris, partly because of its significance as an example of nineteenth-century Neoclassical architecture, but also because of its site and its congregation. It is the central feature of the brilliant composition Gabriel created on the north side of the **Place de la Concorde**, complemented by the similar facade of the Palais Bourbon (the National Assembly) in the opposite direction. Views down three of Paris's famous grand boulevards terminate in the Madeleine. As the most visible monument of the Restoration and the July Monarchy (periods in France's history, after the French Revolution, when the monarchy was reestablished), the



The Madeleine in Paris (the church of Saint Mary Magdalene, 1807–1842), is a Greco-Roman temple that dominates the view north from the Place de la Concorde. Originally intended to celebrate France's culture heroes, it is now one of the most prestigious churches in Paris.

Madeleine was from its consecration a very fashionable church for the Parisian upper classes; many still attend mass and marry there. It took nearly a century for the church to be built and consecrated, however, and it almost became a train station.

History of the Site

There had been a church, Madeleine de la Ville-l'Évêque, on the site of the Madeleine for centuries. By the middle of the eighteenth century, the city was expanding in this direction, and in 1757, as part of the development of the Place Louis XV (now **Place de la Concorde**), it was decided to replace the old church. The new church of the Madeleine was, from the beginning, to be the Right Bank (the north bank of the Seine River) counterpart to the church of Ste-Geneviève (which ultimately was secularized and became the **Panthéon**). Pierre Contant d'Ivry was given the commission in 1764. Foundations for his conservative church, loosely based on the **Invalides**, were barely finished when he died in 1777. A successor modified his plan, adding a columned porch that wrapped around it, anticipating what was finally built, but the French Revolution brought construction to a halt for fifteen years.

Revolutionaries proposed various uses for the site: a legislative building, a national library (see **Bibliothèque Nationale François Mitterand**), a

stock exchange, and finally, in 1806, a temple dedicated to the army. Since Emperor Napoleon I made this last proposal, it was the use chosen. Léon Vaudoyer was given the commission, but Napoleon did not like his design and commissioned Pierre Vignon. He had the site cleared of what had been constructed to that point. Vignon's design was built, at least the exterior, but after restoration of the monarchy, King Louis XVIII decided to turn it back into a church as atonement for the murders of the royal family during the Revolution (thus its connection to the aristocracy). The necessary modifications were begun on the interior. At this time, the church was still just surrounded by open land, and for young Romantics its image, especially at night, conjured up images of the Acropolis. In 1837, the unfinished building nearly became the Paris terminal of the first railroad line to be built in France (from Paris to St-Germain-en-Laye). It was finished by Jacques-Marie Huvé after Vignon's death, however, and finally consecrated in 1842.

Exterior

The Madeleine is frequently described in guidebooks as a "Greek" temple, but it is based more on Roman than Greek prototypes. Like Greek temples, it has freestanding columns all around the sanctuary, which is a rectangular stone enclosure. Unlike Greek temples of this type, which had three steps on all four sides, but like Roman temples, the Madeleine has no steps on the sides; there is a grand staircase of twenty-eight steps on each end. The Madeleine is large, 472 by 349 feet, with columns of the *Corinthian Order* (also characteristically Roman, not Greek) over 60 feet tall. The *frieze* and the *pediment* are richly sculpted, the latter with a group by Lemaire representing Mary Magdalene imploring Christ at the Last Judgment. Bronze entry doors are decorated with reliefs representing the Ten Commandments. Several of the other sculptures, both in the vestibule and in the sanctuary, are by Rude, who did the most famous sculpture on the **Arc de Triomphe**.

Interior

Beyond the bronze entry doors, a broad vestibule opens onto the single *nave*. It is covered with three domes that have round skylights (*oculi*) at their tops, the only source of natural light in the interior. The domes rest on arches that are supported by freestanding Corinthian columns that frame side altars. Relief sculpture ornaments most of the surfaces in the upper parts of the church: the undersides of the domes, the *pendentives* that connect the columns to the bottom of the dome, and the undersides of the arches.

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MAISON CARRÉE. *See* Nîmes: The Maison Carrée.

MAISONS: CHATEAU, MAISONS-LAFFITTE

Styles: French Baroque/Early Louis XIV

Dates: 1641–1650/1658 and 1660

Architect: François Mansart (1598–1666)

René de Longueil (1596–1677) commissioned the chateau (manor) of Maisons named for the nearby village, from François Mansart, the most famous French architect of the period and one of the greatest from any period. It is, in many respects, Mansart's masterpiece and his only work with nearly intact interiors. Charles Perrault, Louis XIV's director of buildings, thought that "The chateau of Maisons [by] Mansart is of such singular beauty that virtually all foreign visitors find it one of the most beautiful things we have in France" (Mignot 1998, 1, author's translation). Maisons was almost the only thing in France that Bernini, the most famous artist in Europe of his time, praised on his visit to France.

The Client and the Commission

René de Longueil was a famous lawyer, a member of parliament, and overseer of the chateaux of Versailles and St-Germain-en-Laye. He inherited the property west of Paris on the banks of a branch of the Seine River on which Maisons was built; his wife's considerable fortune paid for it. She died in 1636, several years before the chateau was begun. It may have been a sort of symbolic, sumptuous memorial to her, since there are many references to her, Madeleine Boulenc de Crèvecœur, in monograms and other decorations in it.

Longueil probably commissioned the chateau in 1641 or 1642, though there is no documentation. An attack on Mansart published in 1651 implied that he had ordered his own design demolished and rebuilt during construction. Mansart did have a reputation for being difficult and slow, but this



Garden facade of the chateau of Maisons (1641–1660, called Maisons-Laffitte since 1882). Maisons is one of François Mansart's masterpieces and one of the finest aristocratic manors of France from any period.

account most likely referred to an earlier, smaller building already on the site. Longueil must have been pleased with Mansart, since he apparently gave the architect free rein, as contemporaries remarked.

The Architect

François Mansart came from a Parisian family of builders and sculptors. He was already famous when Longueil commissioned Maisons. He had built, among other things, the chateau of Balleroy; the chapel of the Visitation in Paris, a church comparable in quality to the most advanced contemporary churches in Rome; the Hôtel de la Vrillière (now part of the American Embassy in Paris), and the Gaston d'Orléans wing of the chateau of Blois. Maisons would make him even more famous and lead to commissions for the **Val-de-Grâce**, for rebuilding the **Louvre**, and for a mausoleum for the ruling dynasty at **Saint Denis**. Only the first of these was built, however, and Mansart was fired before it was half finished, so Maisons remains his last great work.

Chronology of Construction

Work on landscaping must have started first, by 1640 or 1641. Longueil's gardens, long since vanished, were by all accounts at least as spectacular as those at the somewhat later **Vaux-le-Vicomte**. The oldest surviving con-

struction records for the chateau are from 1642. Other records suggest that by 1646 the basic construction must have been finished. Ornament by Jacques Sarazin, Gilles Guérin, Philippe de Buyster, and Gérard Van Opstal, among the best sculptors of the time, was carried out during the following years. The large stables that framed one side of the approach to the main court were finished by 1650, and in April of the next year, René de Longueil entertained the Queen Regent, Anne of Austria, and her twelve-year-old son, Louis XIV, at the chateau. By September of the same year, Longueil was in disgrace, but he was back in favor by 1656 and was elevated to marquis two years later.

Architectural Characteristics of the Chateau

Maisons' plan is U-shaped, typical of French Renaissance manors (**Anet**, for example). The main residential wing (the *corp de logis*), which forms the back of the U, and the two side wings define the forecourt. The entry to the chateau is within a relatively elaborate projecting section—the *frontispiece*—at the center of the *corp de logis*, that is, on axis with the avenue that leads to the chateau. The side wings and the *corp de logis* are the same height, but they have low, one-story extensions on their ends. Unlike Blois, the three main blocks of the building meet at right angles without curving transitional pieces. The low extensions have flat roofs, but each of the blocks seems to have a separate, steep *Mansard roof*. In fact, it is not a true Mansard roof; there is a flat terrace for viewing on top of all the roofs, since the chateau was designed to take advantage of the views to the east, across the Seine, to Paris and to the west into the great forest of St. Germain and the formal gardens. Very few features of Medieval fortresses survive. The moats that originally surrounded the chateau on all sides—those on the entry side of Maisons were filled in in the late 1800s—were purely symbolic; only the aristocracy was allowed to have them.

The *corps de logis* builds up and out in stages. Its broad central section projects several feet in front of the rest of the block, and the frontispiece steps out a bit further yet. It is also more sculptural, with rows of fully round columns, *Doric* on the ground floor and *Ionic* on the floor above, rather than the *pilasters* (flat, columnlike strips attached to the wall) that ornament the surface of the rest of the *corps de logis*. On the ground floor, a slightly narrower section, which contains the entry door in its middle, steps out even further.

The entry door is not emphasized; it is not significantly larger than the windows to each side of it, nor is there a *pediment* (a triangular element like the gable end of a temple) above it, at least not directly: The pediment is three stories above the door, at the very top of the frontispiece, and it crowns a deep slot of space the same width and depth as the recess containing the entry door. This continuous slot of space, which rises from the ground to split the horizontal molding across the bottom of the pediment, is the sort of vigorous detail associated with Michelangelo, an architect whom, to judge

from other details in his work, Mansart much admired. Mansart's genius is also seen in such details as the tall chimneys that terminate in a shallow curve. Those on the ends of the side wings are well off-center, that is, asymmetrical with respect to the end facades. These facades are, however, mirror images of each other; they "inflect" toward the center, creating a dynamic balance. Similarly, the rest of the several chimneys defy strict classicist practice to create a dramatic, interesting composition that pleasantly surprises.

On the garden side of the chateau, the side blocks project only slightly from the corps de logis, scarcely more than its center, which remains the climax of the facade composition. Only a shallow, one-story-high porch of Doric columns projects from the end pavilions. This time, Mansart resolved the imbalance of the entry side; chimneys are introduced in symmetrical pairs, creating a classically balanced facade, in direct contrast to the dynamic entry.

The Interiors

Though Maisons' vestibule was not quite the first time a room in a French residence had been devoted entirely to entry, it was still a novelty. Previously, entry was directly into a staircase, either an exterior stair tower (as at the François I wing at Blois) or at the base of an internal stairs (as at Azay-le-Rideau). Maisons' vestibule is a separate, transitional space with large windows on both sides, giving a clear view from the forecourt to the Seine, or from the gardens to the forecourt. It is all whites; no rich materials or colors are used; no marbles, paintings, or gilding. Instead, the architectural details are refined and elaborate, and there is an abundance of sculpture, both relief and statues, among them four eagles perched in the corners of the *entablature*. These may simply be a decorative motif that Mansart liked (and used in several buildings), but they may also be a visual pun: in French, the eagle's great eyesight or "long view" is "long œil," which sounds like "Longueil."

With the vestibule serving only an entry function, stairs to the upper floors have been moved up a short flight of steps into a multistory room devoted to them. It is one of Mansart's most beautiful creations and the most impressive room in the chateau. Straight flights of stairs seem to float, unsupported, on three sides of the square room. The bare ground-floor walls focus attention on the fine masonry construction. The walls of the floor above are enlivened by doors (some real, some false), windows, pilasters, and a series of sculptures, mostly of children that sit on cornices and look down. The vault above the stairs has been cut open, as in the earlier staircase at Blois, in a circular shape flattened by the sides of the square room. Light comes down through its center from a lantern in the dome of the third-floor ceiling. This sequence of vestibule and stair-hall has all the drama associated with the Baroque architecture of Bernini or Guarini.

From the top of the staircase to the corner of the chateau extended a series of rooms, the *appartement à l'italienne*. The Italian manner, so-called be-

cause the ceilings are vaulted instead of having closely spaced, decoratively painted, heavy beams, had recently become fashionable in France. The first in the suite of the chateau's formal reception rooms, a large hall, was used for concerts and balls and has a musicians' gallery. Next was the antechamber for the apartment reserved for the king's visits, which were frequent at Maisons. It had a large fireplace, behind which was the king's bedroom, which had a large alcove and a canopy bed, a theatrical treatment of the bedroom that was also newly fashionable. Off a second bedroom, also in the "Italian manner," that could be reached from the antechamber is the most elaborate in the series of rooms *à l'Italienne*, a small, circular room with mirrored walls between wooden pilasters above which are gilt moldings and a painted ceiling. This is the earliest surviving example of the intimate "mirrored cabinets" that later became fashionable. The vaulted ceilings in this entire suite of rooms were so high that the floor above them was virtually useless.

René de Longueil's apartment was below, on the ground floor. The flat-roofed, one-story projection at its end was the chateau's chapel. Services for the chateau (kitchen, wine cellar, storage rooms) were in the basement. Many of these rooms opened directly out into the dry moat and were connected by a tunnel (which still exists) with the village of Maisons, so that supplies of all kinds could be brought directly into the basement storerooms.

The Site Plan and Gardens

René de Longueil's park consisted of more than 800 acres around the chateau and an avenue that extended miles into the forest of Saint-Germain. The park and the avenue that crossed at right angles in front of the chateau's forecourt were planted with rows of trees on either side. An avenue at the center of a series of landscaped terraces that stepped down to the Seine extended visually across a bridge and an island in the Seine. The park was a "Baroque" composition that, in its dramatic complexity, anticipates and rivals Le Notre's designs for Vaux-le-Vicomte and Versailles.

Maisons after René de Longueil: An Amputated Estate

The ground-floor apartment on the opposite side of the main staircase from the *appartement à l'Italienne* was redecorated in a neoclassical style when the Count d'Artois, the future king, Charles X, and the brother of King Louis XVI, purchased the chateau from Longueil's heirs in 1777. Above it, a suite of rooms with roughly the same plan was redecorated when the Marshall Lannes, Duke de Montebello, bought Maisons in 1804.

Jacques Laffitte (1767–1844), governor of the Bank of France, bought Maisons in 1818 from Marshall Lannes. He was president of the cabinet of King Louis-Philippe from 1830–1831, but joined the opposition and suffered financial reverses that nearly bankrupted him. He almost certainly saved the chateau from being demolished, the fate of so many French manors after the Revolution, but his dire financial straits forced him, in 1833, to subdivide the park around the chateau and create a development patterned after picturesque En-

glish suburbs. Unfortunately, Mansart's stables, thought to be the most beautiful in France, were demolished at this time, their materials used to build some of the new houses in the development. Because the colony he founded at Maisons prospered, the town of Maisons-sur-Seine was renamed Maisons-Laffitte in his honor in 1882, as was the chateau.

Vassili Tilmanovitch Grommé (Wilhelm Tilman Gromme), a painter, bought the estate in 1877 and had the dry moat on the approach to the chateau filled in and the entry court shortened, making the chateau look like many of the city halls that it inspired. In 1905, the chateau was sold again, to be demolished for further building lots. After a public campaign, it was bought by the government and opened to the public in 1912 as an annex to the Louvre. From 1911 to 1933, the State bought about ten acres around the chateau to protect it from further development and to restore (in 1956), at least in their outlines, the gardens between the chateau and the Seine River. Nothing could be done about the urban sprawl that has ruined the view across the Seine from the chateau.

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MARSEILLES BLOCK. *See Unité d'Habitation* (Marseilles Block).

METRO (SUBWAY) STATIONS, PARIS

Styles: Known Variously as Métro Style, Style Guimard, Modern' Style, and Art Nouveau

Dates: 1899–1913

Architect: Hector Guimard (1882–1942)

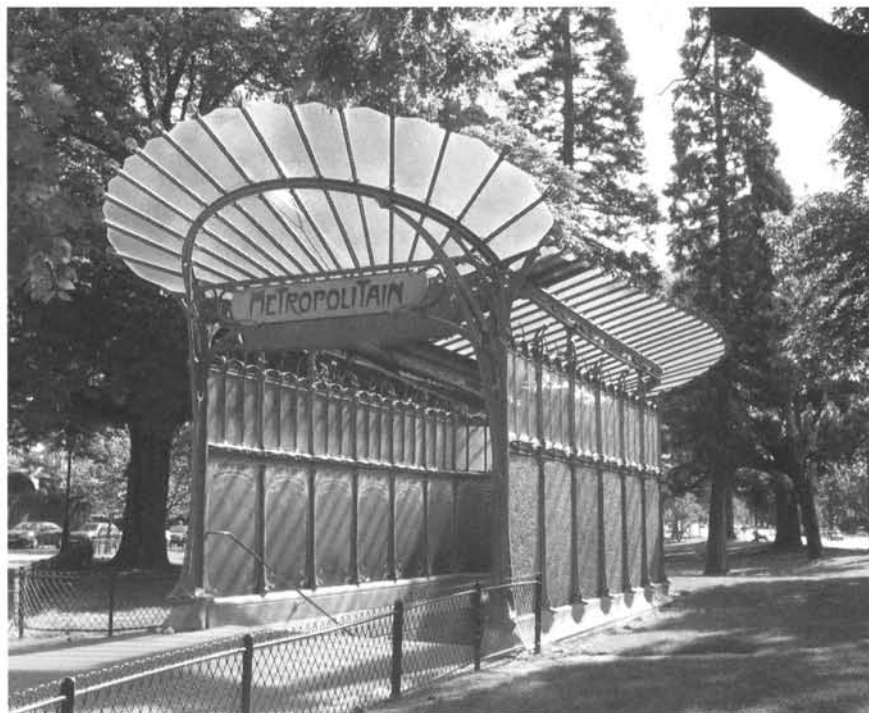
Hector Guimard's entrances for the Paris subway, the Metro, are immediately recognizable symbols of both Paris and Art Nouveau. Their sinuous curves of green metal resemble stalks of some unknown plant rising up from the pavement and, depending on the station, end in amber, budlike bulbs or a fan of glass. The green lettering on the yellow signs indicating the Metro station has become a standard Art Nouveau font, even on computers. Like the posters of Toulouse-Lautrec or the cancan, Guimard's Metro entrances conjure up Belle Epoque, turn-of-the-century Paris, then the fashion center of the Western world.

Guimard's architecture was not based on the eclecticism of the *École-des-Beaux-Arts*, characterized by traditional motifs from the history of architecture repeated in various combinations. Instead, based on the teachings of his heroes, Viollet-le-Duc and the Belgian architect Victor Horta, Guimard created a new style in which modern, unconventional materials (iron, steel, brick, glass block, glazed tiles) were used openly and mixed with traditional materials, and in which asymmetry predominated. Art Nouveau, known as the Modern style in France, was above all a rejection of historicist copying from past architecture. (The term Art Nouveau comes from a Paris shop, but until recently was used almost exclusively in English-speaking countries.) Art Nouveau architects like Guimard used traditional luxurious materials and exuberant decoration combined with industrial materials and processes. To some, Guimard's "Metro Style" was modern; to some it was nightmarish; to others, it represented bad taste.

Guimard and a "New" Art

Guimard went to the *École des Beaux Arts*, the premier school of architecture in the world at the time, but he never received his diploma—he refused to create in the academic style expected. His drawing talent got him a position teaching at the *École des Arts Décoratifs*, where he stayed from 1891 to 1900.

He developed his own personal approach to architecture in a matter of months during the middle of that period, thanks to a commission for a large apartment building, the *Castel Bérenger*, which he designed in a vaguely Medieval idiom, heavily influenced by the architecture of Viollet-le-Duc. In the spring of 1895, before construction on it began, he went to Brussels to visit Victor Horta, an architect who had designed a house that was widely considered a new direction in architecture. Guimard was so impressed with the *Tassel House*, now generally recognized as the seminal work of Art Nouveau architecture, and other projects in Horta's office, that when he returned to Paris, he changed as much of the *Castel Bérenger* as he could. Since construction was to start at the end of the summer, his changes were largely restricted to ornament and decoration, much of which is, in fact, quite similar to Horta's. The *Castel Bérenger* was awarded first prize in 1899, in the first competition for facades sponsored by the city of Paris. Guimard rapidly dis-



Because of Hector Guimard's entrances for the Paris subway system (The Metro, 1901–1902), Parisian Art Nouveau was popularly known as the “Metro Style.”

tinguished his style from Horta's or Viollet's in the many commissions that followed. One of the first architects to appreciate the importance of publicity, Guimard produced a series of postcards of his buildings, furniture, and graphic designs, each prominently titled “Le Style Guimard.”

The Metro

In August 1899, the company that was building the “Métropolitain” subway system for the 1900 Universal Exposition held a competition to design the entries for the first line of the Paris subway. The winning designs were embarrassingly conventional and unoriginal. Adrien Bénard, the president of the company, turned in desperation to Guimard, newly famous, and gave him until February 15, 1901 to present alternative designs. He both met the deadline and fulfilled the original competition requirements for a simple station with a balustrade on three sides and posts carrying a sign identifying the station. He also designed three types of pavilion entries, ranging from a fairly simple one to an elaborate station with ticket offices and waiting rooms.

Guimard's proposals were viewed—for better or worse—as a victory over the academics that dominated architecture in France. He had rethought every element of architecture: supporting elements and how they connected to what they supported; how glass, iron, and stone could be combined in one continuous form; how to drain water from roofs; how to use mass-produced elements. Even though his designs were both decorative and ornamental, he was one of the first modern architects.

Though looking handcrafted and organic (the forms were based on plants and animal skeletons), Guimard's Metro entrances were made from a kit of relatively few prefabricated parts of cast iron that could be assembled in a wide number of variations. Since the parts were cast in a series, in effect mass produced, the cost of an individual station was dramatically reduced compared to building one at a time. The kit of parts also allowed them to be erected extremely quickly with relatively unskilled labor.

Guimard Leaves Metro

Within a year of submitting his design, Guimard and the company argued over financial arrangements; in 1902, these disagreements were unsatisfactorily resolved. The “Metro Style” was not universally popular for various reasons, not least because it was seen as an imported style—from Belgium, no less. Guimard's entry for the square in front of the Paris Opera met with such public protest, for example, that the design was given to a different architect, who erected a conventional stone balustrade (probably a good solution in that case). In 1904, after this scandal, the Métro Company let Guimard go permanently. His stations continued to be built until 1913, but he had signed over all rights to them to the company.

Guimard after the Metro

After losing the battle over the Opera station, Guimard designed only one public building, a concert hall, but many houses, and apartment buildings. Guimard became very ill, and died in New York in 1942. Because of the war, his death was not known in France until 1945. After his widow returned to Paris, she tried unsuccessfully to save many of his buildings from demolition.

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MONT SAINT MICHEL, NORTHWESTERN FRANCE

Styles: Romanesque and Gothic

Dates: Eighth to Fifteenth Centuries

Architect: Unknown

Impregnable Castle and New Jerusalem

Even to the modern visitor, Mont St. Michel looks like a fantasy castle thrusting up from the sea. How much more extraordinary it must have seemed 700 years ago, when dragons and demons were believed real! The Benedictine Order of monks who built most of it conceived it to be, if not fantastic, at least unworldly: a representation of the New Jerusalem described in the Apocalypse and just as difficult to get to.

The island on which it was built, a 262-foot-high conical rock in the sea off the northwest coast of France, was accessible only by boat at high tide. At low tide, visitors could walk across the sand to it, but that was dangerous. Patches of quicksand sucked down those unfamiliar with the area, and frequent fogs and mists made it easy even for locals to get lost and wander into quicksand. Besides, high tides are nearly 50 feet above low tide and race in at 200 feet per minute or more, faster than man or horse can run, drowning the unwary. These natural characteristics made the island, on the border between Normandy and Brittany, one of the most secure and easily defended spots in the region. Strategically important during the tenth-century Viking raids and shifting Medieval politics, Mont St. Michel became as much fortress as pilgrimage church and monastery; as much a castle as the City of God.

Building Chronology

About 708, a Christian oratory replaced prehistoric and Roman constructions on the island. Between 870 and 930, this oratory, probably meant to be a simulation of a cave in southern Italy where, according to tradition, St. Michael first appeared in Europe, was in turn replaced by *Notre-Dame sous-Terre* (Our Lady Below Ground), which still exists. It is crudely built, evidence of a time in this part of France when there was little building, thus few experienced craftsmen or architects. The Benedictines, who took control of the island in 966, were by contrast great and experienced builders.

Not long after they arrived, the island had become part of Normandy. Most of the church and much of the monastery that they built was constructed during the reign of the great Norman ruler, William the Conqueror



Mont St. Michel, a fortress-monastery off the coast of northwestern France, is unique. It is an island that rises from the sea like a dream castle or a movie set, but it is real, built over centuries around a rocky cone.

(1035–1087). *La Merveille* (“the Marvel”), which contains the most spectacular of the public halls, was built after 1204, when Philip Augustus, king of France, had conquered Normandy. The church’s Gothic *choir* was built much later, in 1450, after the end of the Hundred Years’ War. Constructed in a chronological spiral around the rock core, each of these stages of building served as a foundation for the next. The walls of *Notre-Dame-sous-Terre*, for example, became part of the support for the *nave* of the church, whose *crossing* (intersection of nave, choir, and *transepts*) is on the peak of the cone.

Part of the money to build Mont St. Michel came from pilgrims to the abbey, and some came from wealthy individuals who wished the monks to pray for their souls; but in large part, kings and local nobles built Mont St. Michel as a fortress to protect them. Although many Medieval monasteries were fortified because they were among the few places secure enough for the upper classes to leave valuables, Mont St. Michel was nearly unique in also being a military fortress. It was so impregnable that even Philip Augustus could not take it, and in frustration, in 1204, he burned the unfortified village that had grown up around its base. When it was rebuilt, around 1240, the village was also fortified. Robert Jolivet modernized the fortress in 1417, when the English threatened the abbey, and he rebuilt its fortifications again when he switched allegiance to the English. During the Hundred Years’ War, when artillery was introduced into warfare, the fortress walls were once again updated. Vauban, the great French military engineer, called them “the boldest, most consummate [fortifications] in the world.”

Visitors had to pass through a single entry, a fortified gate with a *portcullis* (an iron grille that could be lowered to close off the opening), followed by a steep staircase that was flanked by two round towers with slots for firing weapons across it. Beyond the staircase was the grand Hall of the Guard, after which visitors had to pass through another series of fortified gates, each with a portcullis, before reaching the main staircase to the church and abbey, the Grand Degré stairs. This sequence is still awe inspiring.

Construction of Mont St. Michel

The monks themselves probably built the earliest stages of Mont St. Michel, but as buildings became larger and construction more complicated, highly trained professionals and craftsmen would have been brought in. This evolution from amateur builder to professional is readily apparent in the gradual refinement of the masonry. The walls of Notre-Dame-sous-Terre are made of irregular, unshaped pieces of stone laid in thick mortar. Masonry in the nave of the Norman church has a core of regular but undressed (roughly shaped) stone with thick mortar joints faced with finely dressed stone. In the next stage, the Gothic choir and La Merveille, all of the masonry is dressed and laid with thin mortar joints. Masons's marks resembling cattle brands indicate who carved each stone—and who was to be paid for it. Carpenters were nearly as well paid and nearly as respected as the masons; lumber, especially for the big roof and floor beams, was a major item in the cost of a Medieval building. Unfortunately, records of the names of the architects, masons, and carpenters who built Mont St. Michel were destroyed in fires at the end of the Second World War.

The character of spaces in the monastery varies with these changes in construction. In the *Romanesque* parts of the church, because the construction was crude, walls and vaults are thick, and window and door openings are relatively small. Consequently, interiors are darker and more cavelike than those in Gothic sections, with their sophisticated, skeletonlike construction. Gothic walls are thin and windows large, making the rooms both visually and physically light.

The Monastic Church

Typical of Norman Romanesque architecture (see the **Abbaye aux Hommes** at Caen for a discussion of Norman vaulting), the nave of the church is covered with a wood *barrel vault* and the side *aisles* with stone vaults. The sides of the nave have three floors: a ground-floor arcade that divides nave from side aisles, a second-floor *gallery*, and windows high in the wall (*clerestories*) above the gallery. At first glance, the north and south walls of the nave look identical, but the north side collapsed in 1103—probably because the mortar was made with sea sand, which has salt in it—and was rebuilt more carefully and solidly with smaller openings.

The church's interior varies in several ways. The entry vestibule is several steps higher than the terrace in front of the church, the nave is 5 feet higher

than the vestibule, the crossing is almost 3 feet higher than the nave, and the *chancel* is 10 feet higher than the crossing. This stepping up from the profane to the holiest part of the church was imaginative for its time and is reinforced by the lighting, which increases dramatically at the monumental transepts, impressive in size for the time. Beyond the transepts, the chancel is flooded with light. This increasing amount of light is a direct result of the changes in style and construction from Romanesque to Late Gothic. The original Romanesque chancel, which collapsed on September 20, 1421, during the Hundred Years' War, would have been about as dark as the transepts. Its reconstruction was interrupted by war and not resumed until 1500, thus it was completed in a late Gothic style on the old Romanesque foundations. The columns soar, unimpeded by moldings, column capitals, or sculptures, from the pavement to the top of the vaults, 80 feet above the floor. Almost unique among Gothic churches, the gallery, which is retained as a narrow passage, passes behind the columns on the interior of the chancel and forms a broken horizontal on the exterior. All structural supports are made as thin as possible so that the walls appear to be mostly glass on all three levels. Stone bars (*tracery*) that hold the glass in place are curved in flamelike shapes, thus the name *Flamboyant* for this style of architecture. *Flying buttresses* that leap into space from the tops of the exterior walls to freestanding supports help stabilize the light, delicate structure. The choir is less ornamented than is typical of Flamboyant architecture, and most of the ornaments that once existed have disappeared. Originally, the tops of the external buttresses were carved into angels playing instruments, but they have been restored as simple, abstract pinnacles.

La Merveille: "The Marvel"

La Merveille is a daring balancing act in stone, a Medieval skyscraper built to the north of the church when Raoul des Iles was abbot (1212–1228). It has long been called "the marvel" (or miracle) because even today it seems as if only a "miracle" prevents the stack of large, vaulted rooms from sliding down the slope of the island's cone into the sea. No other buildings of the period, not even the great Gothic churches, posed more complex structural problems. For the foundations, Raoul des Iles's architect used ingenious, nearly invisible support walls (they are incorporated within the walls of rooms on the lower levels) that resemble large radiator fins. Also invisible are "secret" passages that the monks used when the larger rooms were occupied by visitors.

Abbots' Quarters

In principle, both abbots and monks led a life of poverty, but from 1374 to 1400, abbots Geoffroy de Servon and his successor, Pierre Le Roy, built an enormous lodging for themselves along the south side of the abbey, separated by the Grand Degré staircase from the church. Long and undecorated, the facade is subdivided by powerful structural forms—buttresses,

arches, the five-story “Abbot’s tower” toward the east end, and a narrower “Saint Catherine” tower toward the west—and crowned with *battlements* that emphasize the monastery’s fortified character. In both composition and details, the abbot’s residence looks very much like the pope’s new lodgings in the western wing of the **Palace of the Popes** at Avignon, finished thirty-five years earlier, a similarity that was most likely intended to communicate the abbey’s relation to the papacy, resident in France.

Symbolism in the Merveille

Symbolism was an important “functional” requirement in Medieval, especially in religious, architecture. Usually the client, in this case, the abbot and his advisors, determined what symbols were to be used. Architects, masons, carpenters, and other tradesmen gave them physical form. Some symbols are obvious; for example, the church plan shaped like a cross. Many were more abstract; for example, proportions (the relations between numerical ratios) such as the Golden Section, which many believed God had used to create man. Some symbols had multiple meanings; whereas, “one” typically signified God, “four” could represent the world (the elements, the cardinal points) or the evangelists. “Three” could signify the Holy Trinity, but the three levels in La Merveille represented the hierarchy of Medieval society: workers, soldiers, and clerics. Each level was to have been further subdivided into three parts (not all were completed), resulting in the nine-part grid described in the Book of Revelations. Pilgrims of low rank (workers) were received and fed in the almonry on the bottom level. Guests of higher rank (soldiers) were hosted and feasted on the second level, the guest hall. Monks and priests dined and prayed on the top level. In the unbuilt third, western part of La Merveille, monastic courts (Justice) were to be on the lowest level, the infirmary (Charity) on the second level, and the monks’ chapter house (Obedience) on the top floor. Elaborate ornament and decoration that has disappeared, much of it removed when Mont St. Michel was transformed into a prison, would have made symbolism much clearer than it is today.

Many of the decorations were colorful and would have made the monastery seem less austere than it is today. Floors were covered with enameled tiles, there were stained-glass windows in the church, and frescoes of instructive stories from the Bible or other religious texts covered many walls. Some of the spaces, reflecting social rank, were much more richly decorated than others. The almonry, for the ordinary pilgrims who shared the same meatless fare as the monks (who were forbidden by rule to eat four-legged animals), had little decoration and was dark compared to the guest hall for nobles (who ate meat), which is airy and had stained-glass windows. A row of columns divided both halls into two parts, but they are thick, heavy, and support simple vaults in the almonry, whereas they are slim, elegant, and support delicate, ribbed vaults in the guest hall. The guest hall was one of the few rooms of the abbey that was heated, with three fireplaces, two of them next to the kitchen, which was separated from the rest of the hall by a tap-

estry. Adjacent to the guest hall, though unconnected, was the scriptorium (the monks' library), now called the Hall of the Knights. A low, serene space, divided into three parts by columns, it was also heated to preserve the manuscripts and keep supply the hands of the monks who copied them.

All of these great rooms were vaulted with stone, but the monks' refectory or dining room (on the top floor) has wood vaults to reduce weight and outward thrust on the walls. Buttressing walls would have been very complicated at this height. Instead, the architect used a quick-spaced sequence of vertical stone fins with windows between them for the outer wall. Besides being attractive, this solution, almost unique in Medieval architecture, diffuses light evenly throughout the space.

Mont St. Michel's *cloister*, also on the top level of La Merveille, next to the refectory, is more than 250 feet above the sea. Normally, cloisters are the spiritual and functional center of a monastery (see **Fontenay Abbey**), but the cloister at Mont St. Michel is, by comparison, set apart. It is among the most beautiful of all cloisters, with delicate arcades that originally surrounded a garden. Since Medieval waterproofing was not very good, the garden must have leaked, and it disappeared centuries ago, replaced more recently by a lawn. Everything in the cloister is scaled to the size and movement of individual human beings, the only such area in the monastery. Columns, staggered in two parallel rows, separate covered walkways from the central garden. This offset arrangement of the columns also creates a more structurally stable arrangement than aligned columns would have. The columns, which seem to move past each other as one walks along, were originally made of Purbeck marble, Battle "puddingstone," imported from England. When polished, it takes on a range of colors from blood red to metallic green, thus adding to the variety within the apparent repetition. Unfortunately, the restored columns are of a French stone of a uniform reddish color. Restorations have changed other details of the cloister, too. A nearly continuous, finely carved frieze of imaginary foliage representing a vineyard, signed by its sculptors and finished in 1228, was largely destroyed during the French Revolution and heavily restored in the 1880s. Cloisters were supposed to be places to meditate while walking, and thus ought to have no view of the outer world, but a window was opened from it during a restoration creating a spectacular view.

The Decline and Restoration of Mont St. Michel

Like many others, the abbey gradually declined during the sixteenth century. By 1629, the entire group of monks remaining in the abbey moved into La Merveille and abandoned the other buildings to military personnel. In the late eighteenth century, the underground chapels were turned into store-rooms, wine cellars, and a mill. In 1776, a fire weakened the first three bays of the church, and they had to be demolished. They were replaced by a terrace, and a new Renaissance-style facade with curious neo-Romanesque carvings was erected to close off the truncated nave.

In 1792, after the French Revolution, a prison that had existed on the Mont since the reign of Louis XI was expanded, turning the whole monastery into a prison, which it remained until 1863. Two intermediate floors transformed the great refectory into a dormitory. A single intermediate floor was built in the nave of the church. In 1834, a fire broke out in the upper level, where straw from which the prisoners made hats was stored, and severely damaged the nave. The great space below the Grand Degré staircase, the former ossuary where the monks' bones were piled once their bodies had "turned to dust," was made into a storeroom. The great wheel in it that impresses most visitors as an instrument of Medieval torture was a giant "squirrel cage," which men turned to power a hoist for lifting supplies.

Edouard Corroyer (1872–1889) began restoration of Mont St. Michel in 1874; he was followed by Victor Petitgrand (1889–1898) and Paul Gout (1898–1923). All were pupils of Viollet-le-Duc. Petitgrand rebuilt the crossing tower of the church from the foundation piers up (1890–1897), inspired by Viollet-le-Duc's restoration of **Notre Dame** in Paris. He proportioned the spire so that the gilded statue of St. Michael the "Archangel" on top of it is as high above the floor of the church as the floor of the church is above the sea; that is, the spire effectively doubles the original height of the rock. The statue, by Frémiet, was erected on August 6, 1897, and restored in 1987.

Petitgrand's successor, Paul Gout, changed his predecessors' approach that was, as Viollet-le-Duc wrote, to reestablish a building "in a state of completeness which may never have existed at any given moment." In practice, this meant destroying authentic details and replacing them with invented forms in order to achieve a stylistic unity. Gout and his successors, like most preservationists today, believed in keeping as many original materials and forms as possible as long as they remained structurally sound. Most recently, Yves-Marie Froidevaux (1957–1983) restored the crypts and Romanesque parts of the abbey. Currently, Pierre-André Leblaud is working to restore (imaginatively) some of the luxurious interiors of the monastery and the houses of the village. The Mont continues to evolve. At present, the abbots' quarters house the administration.

The Village and Monastic Fortress

Visitors today remark on the tourist shops selling curios along the single street that leads up to the abbey. Judging from illustrations in manuscripts, curios were always sold along this street, which by the fourteenth century had spread almost continuously from port to monastery. Then as now, it was lined with restaurants and hotels as well as souvenir shops and houses for the villagers. Most of the houses have been rebuilt several times, most recently during the nineteenth century when the original facades, which were a heavy timber frame infilled with plaster panels, were replaced by stone constructions. Recently, some of the original half-timbered facades have been restored.

Unfortunately, the Mont has nearly become a peninsula because of a

causeway built in the nineteenth century to connect the island to the mainland. As a result of it and modifications to the courses of local rivers, the bay has gradually silted up—coincidentally reducing the amount of quicksand. This silting process has been accelerated by farmers' reclaiming fields from the bay for grazing sheep. There are ambitious plans by the French government to restore the Mont to an island.

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NÎMES: AMPHITHEATER, NÎMES

Style: Roman

Date: Second Half of First Century C.E.

Architect: Unknown

Just as the **Maison Carrée** at Nîmes is one of the best preserved Roman temples, the amphitheater in the same city is one of the best preserved of all ancient buildings of that type, of which the most famous and largest is the Colosseum in Rome. Sixty other Roman amphitheaters still exist in some form. Nineteen are larger than the one at Nîmes, though it held a respectable 21,000 spectators. It is nearly intact. All of the tiers of seating up to the very top, where slaves and women sat, still exist. Even the sockets for the poles that held up an awning that shaded spectators can still be seen. The Nîmes amphitheater is in such good shape that it is still frequently used for performances, though not for gladiatorial combats, public executions, or wild animal hunts, as it was in antiquity.

"Amphitheater," which means "two theaters," is a descriptive term derived from the shape. The characteristic Roman amphitheater looks like two Roman theaters (such as the one at **Orange**) placed so that their diameters coincide. In the theaters, however, the seating was arranged in semicircles, but an amphitheater is usually an oval rather than a circular form. This is a practical compromise of ideal sight lines (the radius of a circle would be the shortest uniform distance to the field) with the need for a larger field for spectacles (which means that some spectators are farther than others from

the field). At Nîmes, the oval is 436 by 331 feet. (By comparison, the Colosseum is 615 by 510 feet.)

Many of the early amphitheaters in Provence, as in northern Italy and Rome, were built of wood, at least until the reign of Emperor Vespasian. However the one in Nîmes, like the similar and probably contemporary one in Arles, was built from the beginning in stone and was probably modeled after the Colosseum in Rome, so called because a colossal statue of Emperor Nero once stood near the site. We do not know precisely when the amphitheater at Nîmes was built, but one difference between it and the Colosseum indicates an approximate date, since we know when the Colosseum was constructed. The piers and the columns that frame the arches on the exterior at Nîmes are carried visually straight up through the two stories of the building. This detail creates a more varied play of shade and shadow than is the case in the Colosseum, where the similarly attached columns are stopped at each level by the smooth, continuous horizontal band of the entablature. Since the breaking of horizontal bands with vertical shadow lines was common in Roman buildings after the Colosseum, scholars see these details as indicating (though not proving) that the Nîmes amphitheater was the later of the two structures. Since the Colosseum was built during the reigns of Emperor Vespasian and his sons, Titus and Domitian, perhaps the Nîmes amphitheater was built during the reign of Emperor Trajan.

The construction techniques at Nîmes raise an interesting question, since, unlike the decorative elements, the building techniques its architect used are characteristic of the period before the Colosseum was built, exemplified by such buildings as the Theater of Marcellus in Rome. The Nîmes architect built the amphitheater almost entirely of stone, whereas a form of concrete was used to build the Colosseum and most large buildings in Rome. Roman concrete—which was more like a thick lime mortar with sand and bricks or pieces of stone mixed in than like modern concrete, which uses iron or steel reinforcing—had many advantages over pure stone construction for large buildings. Most important, since it required much less skilled labor than stone construction, concrete construction was considerably cheaper—and faster. Perhaps, then, it was a matter of pride to create a building of “higher quality” than in the capital. The architect at Nîmes was certainly talented, and he evidently knew the Colosseum. Perhaps mortar was difficult to produce in Gaul, or perhaps, as the historian J. B. Ward-Perkins speculates, the architect doubted the experience and competence of the local builders to build in concrete; or perhaps locals preferred the standards set by the first monumental architecture in the region (such as the *Maison Carrée*). Given the evidence of other Roman building in Gaul, the last seems the most probable explanation.

Whatever the reasons for the fashionable decoration and the conservative construction, the planning of the amphitheater at Nîmes is as brilliant as that in the Roman Colosseum—or in any of the other Roman amphitheaters. Multiple entries at ground level lead to staircases that connect with a series

of broad corridors ringing the assembly space on the outside of each level of seating. Frequent radial passages (still called, picturesquely, “vomitoria” in modern assembly buildings) connect these passages and the stairways to the seating. Just as in today’s sports stadia, spectators got tickets telling them which of the many entrances and staircases to use to go most directly to their seats. The Colosseum and the amphitheater in Nîmes could probably have emptied completely in about five minutes. They are at least as efficient as today’s football stadia, which use the same principles. Today, ticket prices serve to stratify economically the crowds at sporting events. In Roman times, the spectacles in the amphitheaters, circuses, and stadia were mostly free, gifts to the public by wealthy public officials or candidates to public office. One’s social position determined where one was permitted to sit, much as in a Baroque court theater or opera house.

The Amphitheater After the Fall of the Western Roman Empire

Like most of the buildings in Roman Nemausus, the amphitheater suffered from barbarian attacks and immigration. The Visigoths turned it into a fortress, blocking up the arches that support the seating and building defensive towers; they then surrounded the entire amphitheater with a moat. During the Middle Ages, it was transformed into a village for the poor. About 2,000 people lived in structures built into and on the arches and seats of the old amphitheater. By the time it was restored in the nineteenth century, 25 feet of rubble had accumulated and had to be removed.

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NÎMES: THE MAISON CARRÉE, NÎMES

Style: Roman

Date: Circa 10 C.E.

Architect: Unknown

The Best-Preserved Rectangular Roman Temple

Nîmes, which the Romans called Nemausus after the spirit of a local spring, was one of the larger and more prosperous cities in northern

Gaul (Roman France) until the end of the second century c.e. It was then successively attacked by barbarian tribes (Vandals and Visigoths), by Saracens, and finally by the French themselves in the Wars of Religion. Most of the city was destroyed and became prosperous again only in the eighteenth century. One of the few buildings to survive almost intact was an ancient Roman temple, originally dedicated to Emperor Augustus or, it is now believed, commissioned by him and dedicated to his grandsons Gaius and Lucius. Now called the Maison Carrée (“Square House”), it is the best preserved of all rectangular Roman temples. (The **Pantheon** in Rome is in better condition, but it is a round temple.)

Like the Temples of Ancient Rome

Although Nîmes was a provincial city, every effort was made to see that its temple was as fine as any in Rome, its architect among the best available. Both the quality of ornament and the fineness of construction details suggest that the architect may have been sent from Rome itself; at the very least, he was familiar with the architectural styles fashionable in the capital. For example, the floral scroll designs on the frieze of the Maison Carrée are almost duplicates of those on the famous Altar of Peace (Ara Pacis), which was also dedicated to Augustus. Other details are similar to the roughly contemporary temple of Mars Ultor in Rome, suggesting that its architect may also have been connected with the design or execution of the Nîmes temple. There was nothing “provincial” about the Maison Carrée when it was built.

A Synthesis of Cultural Influences

The Maison Carrée is a good example of the cultural synthesis practiced by the Romans. Like most Roman temples of the period, it is a fusion of Etruscan and Greek traditions. From the Etruscans, a central Italian society that had ruled Rome for about a century, the Romans borrowed the basic organization: a simple rectangular structure (the *cella* or ritual space) on a tall podium preceded by a columned porch and stairs. From the Greeks, the Romans borrowed ornamental details like the *Corinthian Order*, and *pediment* (triangular gable) used for the porch. This arrangement of column, *capital*, *entablature*, moldings, and pediment and the proportions and characteristics of each part had been codified by the ancient Greeks centuries earlier, so that viewed from the front, the Maison Carrée bears a striking resemblance to a Greek temple. There are significant differences, however. A typical Greek temple has freestanding columns around all four sides, making the front look almost exactly like the back. Like the typical Etruscan temple, however, the Maison Carrée has a clear front and back. There are freestanding columns and entry only on the front, under the porch; the back and sides have no openings of any kind. Half-columns similar to the Corinthian columns of the porch are attached at regular intervals to the outside walls of the *cella* except on the front, decorating surfaces that otherwise would be blank. A typical Greek temple had three steps that ran continuously around it, but because



The Maison Carrée in Nîmes (c. 10 B.C.E.) is the best-preserved rectangular Roman temple to be found anywhere. Dedicated to the adopted sons of Augustus, it demonstrates the high quality of architecture in provincial Roman capitals.

the Maison Carrée, like most Roman temples, is set up on a podium, 12 feet above the ground at Nîmes, and has a clear front, the stairs are much longer—fifteen steps of Nîmes—and are only on the front. They are quite steep, making the worshiper very aware of the climb to the top, a climb made even more ceremonial because two rectangular spurs as high as the podium frame the bottom of the flight of the stairs, separating worshipers climbing them from the activity around the base of the temple until they emerged to face the entry to the cella, which originally contained statues of Augustus, members of his family, and other gods. In ancient times, few climbed to the top of the stairs, however. As in ancient Greece, only priests and dignitaries were allowed to visit the works of art in the cella, in the “home of the god.” Religious ceremonies took place on the ground in front of the temple, which served as a backdrop for ceremonies and sacrifices.

Romans admired the language Greek architects had developed and its refinements, but they were concerned with a grander and more magnificent architecture that projected an image of Roman power. Already during the relatively conservative age of Augustus, when historic precedent was re-

spected more than it would be in succeeding centuries, Roman temples like the Maison Carrée were more elaborate in important ways than Greek or Etruscan precedents. Greeks preferred the simple *Doric* and *Ionic* Orders for their temples, but the Romans preferred the richer, more elegant, and much more complicated Corinthian. Roman architects would employ the even more elaborate Composite Order as the wealth and the power of the Empire increased.

The Refinements of the Maison Carrée: A Model for Later Generations of Architects

It is mostly by chance that the Maison Carrée survived the fall of the Western Roman Empire when hundreds of other such temples were demolished. Its very survival made it a special model for Renaissance architects, who were trying to recover the forms and details of Roman architecture; but it was especially valued because these architects and their patrons realized the superb quality of its every aspect. There is, for example, an exceptional balance between simplicity and richness and an admirable consistency between part and whole. Ornament is relatively simple and powerful from a distance, but delicate close up. Details like the *cornice* and entablature, for example, create distinct shadow patterns when seen from afar, but because they are undercut (partly separated from the surface behind), light reflected from the background silhouettes details highlighted from the front, a very subtle refinement. The final effect is of magnificence rather than opulence.

The Maison Carrée's proportions are particularly well considered. Front and rear elevations (the facades looked at head-on) can be inscribed in squares, one nested within the other. In plan, the temple misses being a double square by less than 2 feet over a total length of more than 80 feet. This difference is not noticeable, even to most trained eyes, and is a result of reconciling wall thickness with the abstract grid, whose lines have no thickness, that the architect used to lay out the building. This problem occurs for all buildings laid out on a grid, even glass-and-steel skyscrapers, and makes the solution arrived at in the Maison Carrée instructive, even for contemporary architects. For all these reasons, many architects, not the least significant of whom was Thomas Jefferson, have looked to the Maison Carrée as a model.

Thomas Jefferson and the Maison Carrée

Having seen it during his long residence in France, Jefferson considered the Maison Carrée among "the most perfect and precious remains of antiquity" (Whiffen 1996, 103). When he was asked by the directors of public building of the state of Virginia for advice in designing the new capitol, he asked French architect C. L. Clérisseau to send him measured drawings of the Maison Carrée to use as a model. Final drawings of his adaptation of the temple for the new capitol were sent to Richmond by Jefferson early in 1786, and a plaster model a year later. He explained that he had changed the

Corinthian Order of the original to the simpler Ionic Order because he felt that few craftsmen in the United States were sufficiently trained at the time to carve the more complicated Corinthian order. Either he or the contractor, it is not certain which, substituted *pilasters* (flat strips attached to walls that represent columns) for the half-columns around the cella. Construction of Jefferson's design was finished in 1788.

The Maison Carrée Today

At one time or another, the Maison Carrée was a private house, a town hall, a stable, and an Augustinian monastery church. In the seventeenth century, King Louis XIV's prime minister, Colbert, proposed dismantling and reerecting it in the gardens of Versailles. It is now an antiquities museum that has, among other displays, a frieze depicting the spirit Nemausus for whom the city was named. The plaza around the temple, much less open than the original marketplace or forum of the city, has been renovated recently by British architect Norman Foster as part of a cultural district. His very modern art center forms an excellent and respectful background for the building that residents of Nîmes consider their Parthenon.

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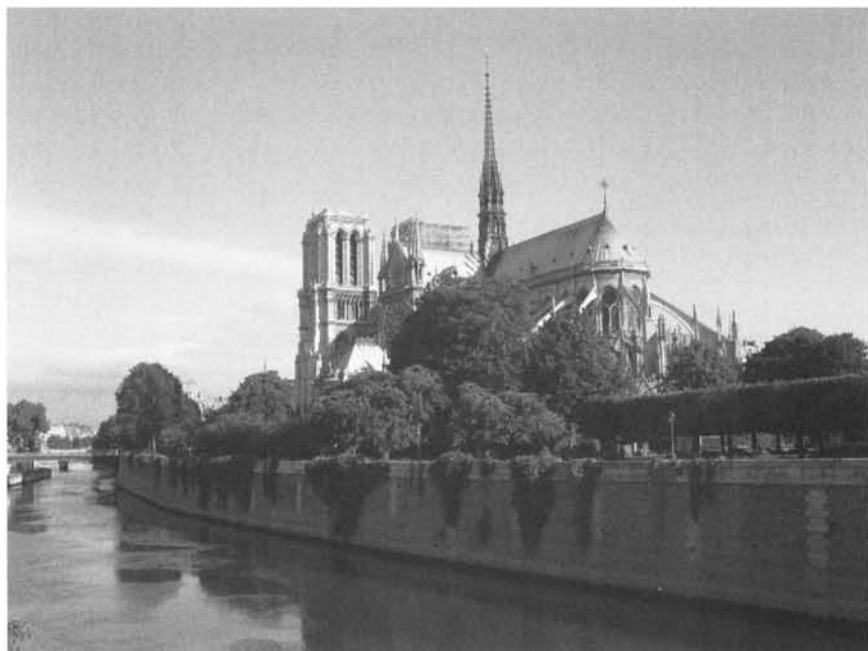
NOTRE DAME, PARIS

Style: Early Gothic

Date: Begun 1161 or 1163

Architects: Original architect(s) unknown; transepts by Pierre de Montreuil and Jean de Chelles

Many French Medieval churches were dedicated to the Virgin Mary, to Notre Dame ("Our Lady"), but "Notre Dame" without qualification is broadly understood to refer to the Gothic cathedral in the center of Paris (when not to an American football team). Its privileged location would be enough to make it among the best-known buildings in the world, but it is also famous because it is the setting of Victor Hugo's 1831 novel, *The Hunchback of Notre Dame* (originally titled *Notre Dame de Paris*), and the movies and



Notre Dame, Paris' cathedral, is probably the best known of all the French Gothic churches and the most famous of the many churches dedicated to "Our Lady." Begun in 1162, it was one of the first churches with flying buttress, though they were added after the church was finished.

musical based on it. This most famous, most immediately recognizable Gothic church is, however, neither the first Gothic church nor the largest. **Saint Denis** Cathedral, or at least significant parts of it, was built earlier, and several later churches are much larger and more richly decorated. Notre Dame de Paris was, however, one of the first churches to be built entirely in the new style and one of the first to use *flying buttresses*, although they were added later. It was influential; architects all over Europe immediately emulated its overall composition as well as its details.

The Need for a New Church

By 362 C.E., a cathedral as large as contemporary churches in Rome had been constructed in Paris on a site just west of the present church. With the decline of the Roman Empire and increasing barbarian attacks, Paris, which had been a Roman imperial residence, had shrunk to a walled, fortified enclosure of less than eighteen acres on the Île de la Cité, the "Island of the City," in the middle of the Seine River. The cathedral, now within the walls, was much larger than it needed to be. By the sixth century, the Frankish king Clovis had made Paris his capital, securing its future status as royal capital. For several centuries, it remained an insignificant small town, but beginning

in the late eleventh and early twelfth centuries, Paris began to flourish and became the richest and most powerful city in France.

The Early Medieval village could not properly maintain the cathedral, now much too large, and it decayed into a near ruinous state. Massive repairs were carried out from 1120 to 1148, and Abbot Suger gave the refurbished cathedral stained-glass windows like those he had introduced into his own church of St. Denis. New doorways, ornamented with sculpture, were created. (One of these, the Portal of the Virgin, modified and rededicated to St. Anne, is the present south door of the cathedral.)

Repairs could not, however, disguise the cathedral's old-fashioned appearance and unsuitability to the rapidly expanding, wealthy Paris. It was large (115 feet wide and 246 feet long), but much smaller than newer churches such as Saint Denis (355 feet long) and Sens (373 feet). Several other cathedrals, especially those in Noyon and Laon, and Paris churches such as St-Martin-des Champs, were not only larger than Notre Dame, they were more "modern." About 1160, it was decided no longer to repair the 800-year-old cathedral but to build an entirely new one. The old one would serve until masses could be held in the new one. Indicative of the pride of the Parisians and their bishop, except for the abbey church of Cluny and the Great Mosque at Cordova, the new cathedral would be significantly larger than almost any other building constructed in the West since Roman times.

The New Cathedral

The new Notre Dame is 402 feet long, 131 feet wide at the facade, and covers 59,000 square feet; the *nave* vaults are 108 feet above the floor, much higher than the naves at Sens (80 feet), Noyon (71 feet), or Laon (85 feet). Paris would have the largest church in France for only thirty years, however, and then Amiens, **Reims**, and Beauvais competed for that honor.

Maurice de Sully, bishop of Paris, directed construction of the new church complex, which also included a new bishop's palace south of the new cathedral, and a hospital for the poor. In reality, the entire east end of the Île de la Cité was to be rebuilt and a new street—the rue Neuve—aligned with the central door of the west facade. Sully was bishop long enough (thirty-six years) for him to have seen much of his project completed by the time he died in 1196. The eastern part of the cathedral was finished, the nave was substantially complete (though it remained unroofed), and the rue Neuve had been cut through the crowded part of the city to the west of the old cathedral. The bishop's palace was probably mostly complete, and the new pauper's hospital had been started, though foundation problems made progress on it slow. Neither of the latter two buildings still exists.

As with all Christian churches of the period, Notre Dame was oriented east-west, which was symbolically important: the setting sun would illuminate the entry (west) facade and priests saying Mass at the high altar at the opposite end would face the rising sun (the coming of Christianity). As in

most churches of the time, the east end is composed of a semicircular *apse* containing the high altar and a rectangular *choir* for the church *canons* (clergy responsible for building and maintaining it). This, the most sacred part of the church, was closed off from the rest of the building with a choir screen (rood screen or *jube*) through which lay worshipers could see but not directly participate in the celebration of the Mass. Immediately to the west of the choir is a square area, the crossing, where the *transepts*, the short arms of the *Latin cross*-shaped plan, intersect with the nave and choir. All these parts (except the curve of the apse) were made up of tall, rectangular units or bays, modules that could be added as the church was constructed.

The name of Sully's architect has not come down to us, but he must have been experienced. Although the plan was conventional, the church as a whole was innovative, aesthetically brilliant, technically advanced, and very well constructed. He not only knew the strengths of the stone available to him, important in building a structure of its size, but even more important, he must have known how to build foundations on marshy ground. Unfortunately, no detailed records have been preserved earlier than the thirteenth-century modifications. Not only have the names of the original architects been lost, but there are no documents that tell how many workers were employed, how the land was acquired, or how the project was financed. Based on records from comparable churches of the period for which we do have records and the speed with which the cathedral was built, at least 500 men must have been employed during summers, and somewhat fewer during the winter. Notre Dame is so homogeneous that details must have been worked out with models and plans before construction began, but they too are lost. Notre Dame's unity of conception and execution remains one of its outstanding characteristics.

Chronology of Construction

Sully's new facade was built 130 feet to the east of the old cathedral, perhaps as a result of difficulties in acquiring property that made eastward extension easier than west. However, this meant that the east end of the church had to be built outside the city walls, and together with the south transept, it had to be built on landfill, which would later cause problems. On the other hand, building the new cathedral to the east of the old one permitted creating a public square when the old structure was demolished, decades after the new apse was finished and usable. Most accounts say that the first stone was laid in 1163, but the church was probably begun in the spring of 1161. By 1177, both apse and choir were finished up to the roof, and by May 19, 1182, when the high altar was consecrated, the entire eastern portion of the church, including its stained-glass windows, was finished.

The nave was completed about 1210–1215 during the reign of Maurice de Sully's successor, Eudes de Sully. For no obvious reason, the nave was constructed at a slight angle to the choir, but this is virtually imperceptible because the architect made clever adjustments to the transepts. The facade,

which was begun at the same time as the nave, was completed by about 1245, when a decision was made to construct a tall spire (*fleche*) over the crossing instead of steeples above the towers, which remain flat-topped.

Classical Balance in a Gothic Church

In most Gothic facades, the vertical lines are emphasized and horizontal lines are understated, but they are balanced in Notre Dame's facade, a classical balance and a resulting monumental calm that is more characteristic of classical (ancient Greek, Roman, or Renaissance) architecture than Gothic. This is a characteristic that distinguishes Notre Dame's from most other Gothic church facades. The towers and buttresses have strongly emphasized lines, but they are countered by the horizontal lines of the "gallery of kings," the tall row of sculptures that extends across the whole facade, and by a row of thin, closely spaced vertical columns that crosses the facade at the base of the towers. This row of columns was almost certainly added after the towers were built to maintain a horizontal-vertical balance, a square grid, not the grid of tall rectangles more typical of Gothic facades. A circular (rose) window inscribed in the square at the center of the facade is a focal point that balances the towers. There are, however, a few exceptions to the apparent regularity, as unexplainable as the misalignment of the nave. For example, a chevron over the left (north) portal helps to disguise the fact that this bay, from the ground to the top of the tower, is wider than the corresponding bay on the right side of the facade, which consequently has no chevron over its portal.

The Interior

Notre Dame's interior is as serene and stately as its facade. Nave *piers* are thick, smooth cylinders, 3½ feet in diameter with ribs springing upward from their *capitals*, almost a metaphor for limbs branching from the trunks of trees. By contrast, piers in later Gothic churches are bundles of small columns that split off as they become, visually, the ribs of vaults, leading one's eye upward from the pavement. Notre Dame's more solid piers march in a measured, stately procession toward the altar, creating a horizontal movement that balances the tendency to look up to the vaults, almost ten stories above the floor. Notre Dame's nave does not seem so high as many other Gothic churches because it is relatively broad compared to its height (about two and a half times as high as it is wide). The two side *aisles* are similarly broad, not much taller than they are wide (about 26 feet high by 20 feet wide).

The sides of the nave are subdivided into three clearly defined stories: a ground-floor arcade, a deep *triforium* gallery that serves as a sort of balcony, and a top story, the same height as the arcade (39 feet) that contains high windows (*clerestories*). This balancing of top and bottom stories corresponds to the classical balance of the west facade, but it was a later, thirteenth-century adjustment. The original clerestory windows were much shorter and

there was a short wall below them with a small round window cut into it, but in the thirteenth century, these two features were combined, creating the single, large pointed window that resembles in size and shape the arched openings in the ground-floor arcade. When he restored Notre Dame in the nineteenth century, Viollet-le-Duc reconstituted an approximation of the original nave elevation in the bays starting just before the transepts. Although it gives visitors an idea of the original appearance, his reconstruction remains controversial.

The Second, Third, and Fourth Masters

A second architect, his name also lost, took over from the first in about 1177. He carried the initial architect's ideas forward without a break in construction, though with some technical improvements that led to spatial refinements. For instance, by using stronger stone, he reduced the size of supports and consequently increased the apparent spaciousness of the interior. He also changed the number of openings in the gallery level from two in the choir to three in the nave, and alternated the shapes of the columns in the side aisles of the nave for purely aesthetic reasons.

A third master replaced the second in about 1200, and began building the facade block instead of continuing the nave. He must have died during its construction because changes in its design indicate that he was replaced by a fourth master within ten years or so. The fourth master completed the remaining bays of the nave. He appears to have adopted an innovation introduced in the recently completed nave of **Chartres Cathedral** by breaking up the surfaces of the identical, smooth, cylindrical piers with small, attached columns that continue past the column capitals into the ribs that spring from them. He, too, made technical innovations in how stone was cut and put together. For instance, according to Viollet-le-Duc more than 58 percent of his rose window in the west facade, 31.5 feet in diameter, is glass, a much higher ratio of glass to stone than any other comparable window.

It was probably the fourth master who enlarged the clerestory windows to bring more light into the church, which was much darker than the newer ones. When he eliminated the wall below the original windows, he had to lower the roofs over the gallery and side aisles because the circular windows in the wall had opened into an attic space under the roofs. The new roofs were nearly flat terraces from which rainwater drained poorly. New gutters had to be created, the roof over the nave modified, and *gargoyles* (carved water spouts) and flying buttresses added to get the water off the building and as far away from lower roofs and the foundations as possible. Iron bars were also embedded in the masonry of the apse to stabilize it and the new clerestory windows. These iron armatures made the window frames independent of the structure of the wall, allowing larger windows and reducing the amount of stone used for the intermediate bars.

Jean de Chelles and Pierre De Montreuil

Originally, the outside of Notre Dame was smoother, simpler, and more severe than it appears today. The modification of the clerestories, the lowering of roofs, the addition of chapels that radiated out from the curve of the apse, and above all, the addition of flying buttresses drastically changed that. During the 1250s, the architect Jean de Chelles—by this time, we know the architect's name—further changed its appearance by designing new transepts with immense rose windows. These modifications may in part have been made to compensate for the effects of the radiating chapels, the addition of which must have made the nave darker since the chapel windows were much farther from the interior than the windows they replaced. Jean de Chelles' new transepts brought in more light, and, probably not incidentally, they provided the bishops a grander entrance (on the south) and the canons a grander entry (on the north). Though the new transepts extended only about 13 feet past the old ones, their impact on the interior was enormous. As the visitor can see today, the space of the church expands dramatically at the transepts when the stained glass in the rose windows comes into view. The effect is still breathtaking. Émile Mâle called the rose window in the north transept "a beautiful flower of mourning," partly because Jean de Chelles died in 1258, having finished only the north transept, and partly because the use of white glass throughout the window balances the red and blue glass and gives it a violet cast.

Pierre de Montreuil, an equally famous and brilliant architect, took over and finished the south transept, slightly modifying de Chelles' design. Though finished later, the southern rose has been "restored" more than the north. Both transepts and their rose windows were immediately and widely imitated. With all of these modifications, Bishop Sully's church had been completely transformed, had become more spatially complex but more organically unified.

Notre Dame in the Succeeding Centuries

Between the mid-1500s and the French Revolution, Notre Dame was poorly maintained and suffered unsympathetic remodeling that included replacing the original Gothic screen around the apse and choir with a more "modern" one in the seventeenth century and enlarging the central portal of the main facade, with the loss of many pieces of sculpture, in the eighteenth. From 1725 to 1727, Germain Boffrand directed the rebuilding of the south transept facade, whose foundations, built on fill, had begun to fail. Worse damage to the church occurred during the French Revolution, especially between 1793 and 1794, when anything connected to royalty was removed or broken up. Statues flanking the entry doors and those in the gallery of kings were pulled down, even though the kings represented were biblical, not French as the revolutionaries thought. Only statues too high to

reach easily were left undamaged. The bishop's palace was ransacked and was in such bad condition that it was demolished early in the nineteenth century. The present promenade between the cathedral and the river was created in its place.

By 1831, when Victor Hugo's *Notre Dame de Paris* appeared, the church was a near ruin, and there was talk of tearing it down. Hugo's book increased public interest in it, and in 1841, a committee was established to evaluate proposals for restoration. A scheme by Eugène Viollet-le-Duc and Jean-Baptiste Lassus was accepted, and in 1845 restoration began. Estimates proved woefully inadequate and had to be supplemented several times. When Lassus died in 1857, Viollet-le-Duc took over. The restoration was largely finished by May 31, 1864, when the cathedral was rededicated.

Viollet-le-Duc's restoration has always been controversial, especially his speculative restoration of the original four-story elevation of the nave in the bays near the crossing. Modern research has shown his design to be wrong in detail, and in any case, it required the destruction of a considerable amount of authentic Gothic architecture. He also disassembled and rebuilt the south rose, turning it 15 degrees so that a mullion coincided with the vertical axis of the window, and he created a new fleche to replace the original crossing spire, which had disappeared sometime during the French Revolution. Although there was a vague drawing of it, the new one is largely Viollet's creation and is usually considered to be brilliant. It has inspired countless others, including the one that tops **Mont Saint Michel**. Sculptures he commissioned to replace those that had been destroyed, though perhaps uninspired, are at least competent and fit beautifully into the overall scheme.

Modern scholars also criticize him for having restored the church so well that it is difficult today to know what is original and what he replaced. He admitted "restoring" the church to an ideal condition that had never existed, an approach that would not be acceptable today, but Viollet was a pioneer in architectural restoration, and at that time almost anyone but Viollet would have compromised the building far more, with work of far inferior quality. There is no doubt that Viollet was the most knowledgeable expert on Gothic architecture at the time—probably of all time.

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NOTRE-DAME-DU-HAUT. *See*
Ronchamp (Notre-Dame-du-Haut).

ORANGE: ROMAN THEATER AND TRIUMPHAL ARCH, ORANGE

Style: Roman

Date: First Century C.E.

Architect: Unknown

Roman Arausio and Medieval Orange

Orange was a relatively large city of 80,000–90,000 inhabitants even before the Romans incorporated it into the early Empire. The Roman city, called Arausio, became one of the more important cities of Northern Gaul (modern France). Most of the large, impressive, Roman-style buildings erected in Arausio—an arena, a circus, a gymnasium, temples, and baths—were demolished, their stones used by later cultures to build fortifications or for the construction of new buildings. However, the theater and commemorative (triumphal) arch, characteristic of most Romanized cities, are among the more important examples of their type that still exist in substantially their original form.

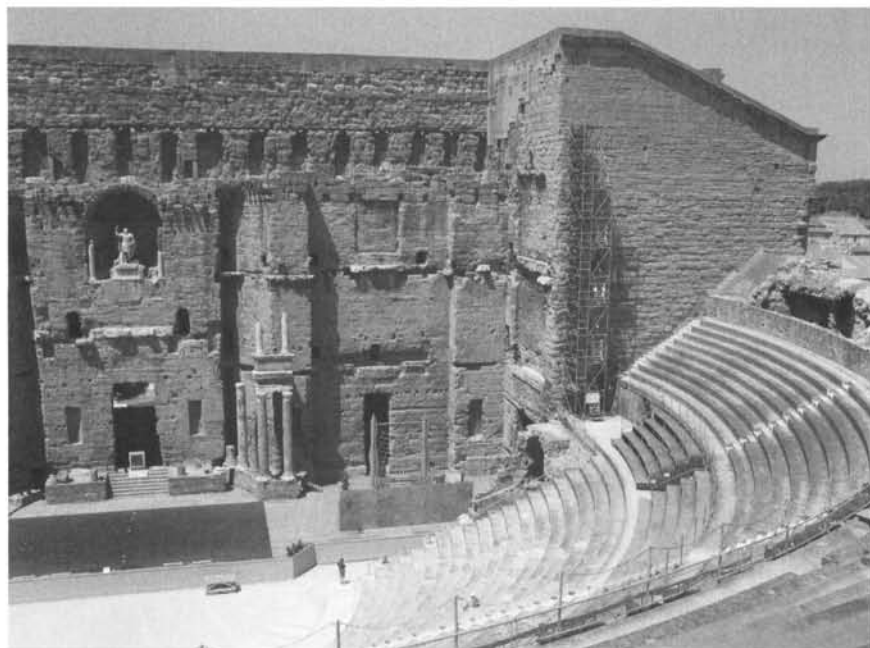
A period of decline followed Arausio's conquest and pillage by barbarian tribes, the Alamans and Visigoths. By the thirteenth century, it had become the capital of a small principality whose rulers were heir to the German duchy of Nassau. During the reign of Maurice of Nassau, the last of the Roman remains were dismantled and incorporated into fortifications. The triumphal arch became part of an outlying fort, and the theater was made part of the city walls. In the seventeenth century, William the Silent, later King William

of England, lost the French part of the principality of Orange and Nassau to Louis XIV.

The Best-Preserved Roman Theater

Despite mistreatment over the centuries, the theater at Orange is overall the best-preserved Roman theater of its type, just as the **Maison Carrée** in Nîmes is the best preserved of the rectangular Roman temples. Like the Maison Carrée and the **Nîmes** amphitheater, it was built during the reign of Augustus Caesar and dedicated in his honor. His statue was found in fragments in the theater and has been reassembled and placed in the central alcove of the stage building. The theater at Orange is unique in still possessing its imperial statue.

Theaters in Gaul are among the earliest Roman examples built outside what is now Italy. The basic type was borrowed from the Greeks, who had refined it over several centuries. There are three main parts to the classical theater. The audience sat in the auditorium, a steeply pitched, semicircular seating area called *cavea* in Latin and *koilon* in Greek. Between the lowest seats and the stage building was a circular floor, called the orchestra, where the chorus danced and sang. Somewhat above the orchestra was a raised platform for the actors called the *proskenion* (we get our theatrical term “proscenium” from it), and behind it, a stage building called *skene* or *scaena* in Latin



Orange's Roman theater, exceptionally well preserved, was built in the first century B.C.E. and is still frequently used for performances.

(we get our words “scene” and “scenery” from it). It served as a permanent backdrop for the actors and also reflected the actors’ voices back toward the audience. Where possible, as at Orange, the semicircular cavea or auditorium was built into a hillside to take advantage of the natural slope. Typically, the audience entered the theater at the bottom of the seating area next to the orchestra, but the theater at Orange is different; its audience entered the seating at its top, that is, the top of the hill.

Differences Between Greek and Roman Theaters as Typified by Orange

The classic Greek theater design is difficult to improve upon, and it is still frequently used for theaters and lecture rooms. It has naturally excellent acoustics since the radial scheme puts the audience closer to the stage than any other possible design. It has excellent sight lines (views of the stage) from any seat because of the steep slope of the cavea. Nevertheless, the Romans made a few changes in the Greek design. In Greek theaters, the orchestra was circular, and the cavea or seating area was somewhat greater than half a circle, so that the side entrances at orchestra level were open passages that met at an obtuse angle with the stage building and separated the seating from it. The stage building itself is only a bit wider than the orchestra. In the Roman theater, both the orchestra and seating are typically exactly a half circle, and the stage building extends across the entire diameter of the seating. This means that the ends of the rows of seating terminated in the stage building, and entrances for the audience are usually covered passages under the seating, along the front of the stage building. The Roman stage building is therefore much larger and more elaborate than in the Greek theater, and the stage or *proskenion* is deeper and wider. The facade of the stage building (*skene*) behind it is also wider, taller, and much more highly ornamented than in the Greek theater. Typically, as at Orange, there was a niche (*exedra*) in the center flanked by two doors. In a Roman, in contrast to a Greek theater, a wooden roof covered the whole stage. *Colonnades* or a colonnaded court connected to the theater provided shelter from the elements for the audience. Further protection for them, especially from the sun, would probably have been provided by a canvas awning strung from wooden masts anchored in projecting stones at the top of the outer wall.

The basic features of the theater were established early, during the age of Augustus Caesar (63 B.C.E.–14 C.E.), but theaters such as the one at Orange gradually became more elaborate. The wall of the stage building, for example, was decorated with a rich and varied play of curved and flat surfaces and of projecting and receding features such as marble columns. Although most of these columns and the sheets of marble that covered the stage-building walls have been stripped away, enough remains to permit its original appearance to be imagined. The city side of the stage building was also richly decorated. Even in its ruined state, King Louis XIV described this immense wall (338 feet long by 118 feet high), which now faces a city

square, as “the finest wall in the kingdom.” In antiquity, this same square was probably a garden surrounded on all sides by a colonnade. The theater at Orange, like the Nîmes amphitheater, is still frequently used for performances.

The Roman Arch at Orange

The commemorative arch in Orange was built in the first century C.E., at about the same time as the theater. It is the third-largest existing Roman arch and one of best preserved. It and other commemorative arches in southern France are similar to ones found in northern Italy, except that the French arches are much more varied and have far more sculptural decoration.

Roman commemorative or triumphal arches, which could be infinitely varied with decorative columns, moldings, and carved reliefs, nevertheless fall into two basic types. The earliest examples had a single arched opening; many later arches had three, a large one in the center and two lower, smaller ones to either side. The arch at Orange appears to be the earliest surviving example of the second type. It was once thought to be a very early example of the triumphal arch, but historians now believe it was erected during the reign



The triumphal arch at Orange.

of Tiberius Caesar, about 21–26 c.e., to commemorate the victory of Julius Caesar over Pompey and the settling of the area around Arausio by his troops. In overall appearance and rich decoration, it resembles the more famous but much later arches of Septimius Severus and Constantine in Rome. Especially considering it is an early example of the triple arch, the triumphal arch at Orange is an architectural masterpiece, with superb decorations, especially the sculptural reliefs on its north side, which are particularly well preserved. The west facade has been heavily restored, and the group of huge statues for which the arch probably originally served as a base has long since disappeared.

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PALACE OF THE POPES, AVIGNON

Style: Gothic

Dates: 1334–1352

Architects: Pierre Poisson, Jean de Louvres, and others

Avignon is a small, picturesque, provincial capital of a region in southern France best known today for its excellent, rich, red wines and its summer arts festivals. Throughout most of the fourteenth century, however, Avignon was a city at least as important as Paris, London, or Rome because the pope, the head of the Roman Catholic Church, lived there in one of the largest castles in Europe. Thus, Avignon, not Rome, was the headquarters of the church.

It is difficult now to understand why the papacy would leave Rome for Avignon, but in the Middle Ages, there were no countries in the modern sense, and the pope was as much a secular ruler as he was the head of the church. As such, he was frequently at odds with the Holy Roman Emperor. Both were heads of a religious empire (symbolic in the emperor's case) and, depending on who had been elected emperor or pope, ruled more or less numerous fiefs spread over most of Europe.

In 1309, Philip IV of France convinced Pope Clement V that Avignon would be a haven from the Holy Roman Emperor and political turmoil in Rome. Avignon had belonged to the papacy since 1274, when it was taken from the Cathars, a heretical sect centered in southwestern France, during

the Albigensian Crusade. Clement's successor, John XXII (reigned 1316–1334), made the move official, beginning what is called the “Babylonian Captivity” after the analogous exile of the Israelites described in the Old Testament. From then until Pope Gregory XI returned the papacy to Rome in 1378, the popes were French and lived in Avignon.

The New Papal Palace

Pope John XXII had been the bishop of Avignon, and he simply transformed the old bishop's residence, south of Avignon Cathedral, into the new papal palace. His successor, Benedict XII (reigned 1334–1342), started construction on an entirely new and much larger papal palace. Benedict's architect, Pierre Poisson, used the Palais Vieux (Pope John's old palace) as a starting point, but by the time he finished, virtually nothing was left of it. The new palace had four wings that created a trapezoidal courtyard, all of whose facades had loggias, exterior porches that doubled as corridors. The outside of the building was austere with a few small windows. It had all the features of a fortress and, just as important, it *looked* heavily fortified and impregnable. A blind arcade on the front of the palace, which faces the main city square, was both decorative and defensive. It supported *machicolations*, openings through which stones, boiling oil, or other unpleasant things could be dropped on the heads of attackers. A freestanding wing was extended past the southeast corner of the courtyard block to give more sun and better ventilation for the private apartments of the pope.

To someone in the twenty-first century, it may seem odd that the palace of the pope would need to be so heavily fortified, but as a temporal lord, the pope needed high, thick walls, guard towers, and fortified entry gates like those of any other secular ruler, there being no separation of church and state at the time. Most bishops' palaces and even many churches, especially in the south of France, were built as castles or fortresses. In addition, mercenaries from the Hundred Years' War (1337–1453) still roamed the countryside, requiring the walls of the city of Avignon as well as the walls of the papal palace to be expanded and reinforced throughout the fourteenth century. Avignon's walls, begun in 1355, were more than three miles long, the longest in Europe at the time. There were gardens and parks within the city, however. The city and palace walls were as much a symbol of the pope's authority as a military necessity.

Arrangement of Rooms in the Palace

In both plan and volume, the papal palace is extremely irregular. For various reasons, church residences in the Middle Ages tended to be much more irregular than royal castles. At Avignon, that irregularity was partly dictated by the site, which was an easily defended high plateau that required the ar-



From 1316 to 1378, Avignon became the official residence of the Roman Catholic Popes, who built a sprawling, heavily fortified Gothic castle (1334–1352) as the official papal residence.

chitect to build walls where there were solid supports for foundations. Also, several additions were made over decades, which tended to make the palace a patchwork of connected buildings punctuated by a series of defensive towers. Supplies, including arms for the soldiers that defended the pope, were housed in successive floors of the *donjon*, the most secure tower in the castle. It was built on the highest part of the site and contained the private rooms of the pope in the so-called Angel Tower, an independent block of rooms whose other stories contained the papal treasury and library.

The sequence of rooms in the various additions that made up the palace was significant and reflected the ceremony by which the pope lived. Access to each successive room was determined by the social rank of the visitor. The pope's apartment, a series of a richly decorated reception rooms approached by a broad stairway leading up from the Great Courtyard, was part of this ceremonial sequence and included a Benediction Loggia (balcony) from which the pope could address crowds in the courtyard below. The entire suite of rooms in Avignon set a precedent for the rebuilding of the Vatican Palace when the papacy returned to Rome.

Clement VI (1342–1352) followed Benedict XII's piecemeal rebuilding with additions that virtually doubled its size. He had two blocks added to the southeastern part to form a second courtyard, the Grand Cour. Clement

added the two pointed towers that spring out halfway up the wall and frame the entrance to the Grand Cour that is the most memorable image of the outside of the palace. His successor, Urban V (1362–1370), did not expand the palace architecturally, but he added its large gardens to the east. With their addition, the Palace of the Popes, like that of the contemporary Muslim palace of the Alhambra at Granada, is much less austere inside its walls than it appears from the exterior. Indeed, the plainness of the walls and simplicity of forms give little hint of the size of the palace, but the northeast tower is 170 feet (fifteen stories). The Palace of the Popes is immense.

By Clement's reign, it was one of the most sumptuous residences of the fourteenth century; new levels of comfort for a Medieval palace had been reached. The papal palace was imitated by many European sovereigns, including princes of the church. A famous addition to **Mont Saint Michel** was modeled after the western block of the papal palace. Artists from all over Europe contributed frescoes and tapestries to the interiors, though little of their work survives. The best preserved frescoes are those in and connected to the pope's apartments, of which the most famous, the frescoes in the *Chambre du Cerf*, show courtly entertainments such as hunting, fishing, and falconry, typical of life in and around the palace. Frescoes in the bedchamber have a series of interlocking, spiraling vines inhabited by birds and animals that look a bit like the Art Nouveau decorations that would be fashionable in late nineteenth-century France.

Without their decorations and furnishings, the palace interiors mostly impress us today by their size. For example, the Palatine Chapel, built during the third phase under Clement VI by Jean de Louvres, is 170 feet long and 82 feet wide, an enormous span for the time. (The *nave* of **Notre Dame** in Paris is only half as wide.) Such large, broad spaces without side aisles are typical of the south of France, where they were preferred to the relatively narrow but extremely tall spaces of the north. Though the details of the chapel are fine, there is little of the delicate carving and tracery that are characteristic of the period.

After the popes returned to Rome in 1377, papal legates continued to use the Palais des Papes until the French Revolution, when it was sacked and turned into a prison and archive. During this period, the building was heavily damaged, and most of the contents and decorations disappeared. Starting at the beginning of the twentieth century, the palace has been gradually restored and now is the main location for plays and concerts during Avignon's summer arts festival.

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PALAIS GARNIER. *See* Paris Opera
(Palais Garnier).

PALAIS JACQUES CŒUR. *See* Jacques
Cœur House.

PANTHÉON, PARIS

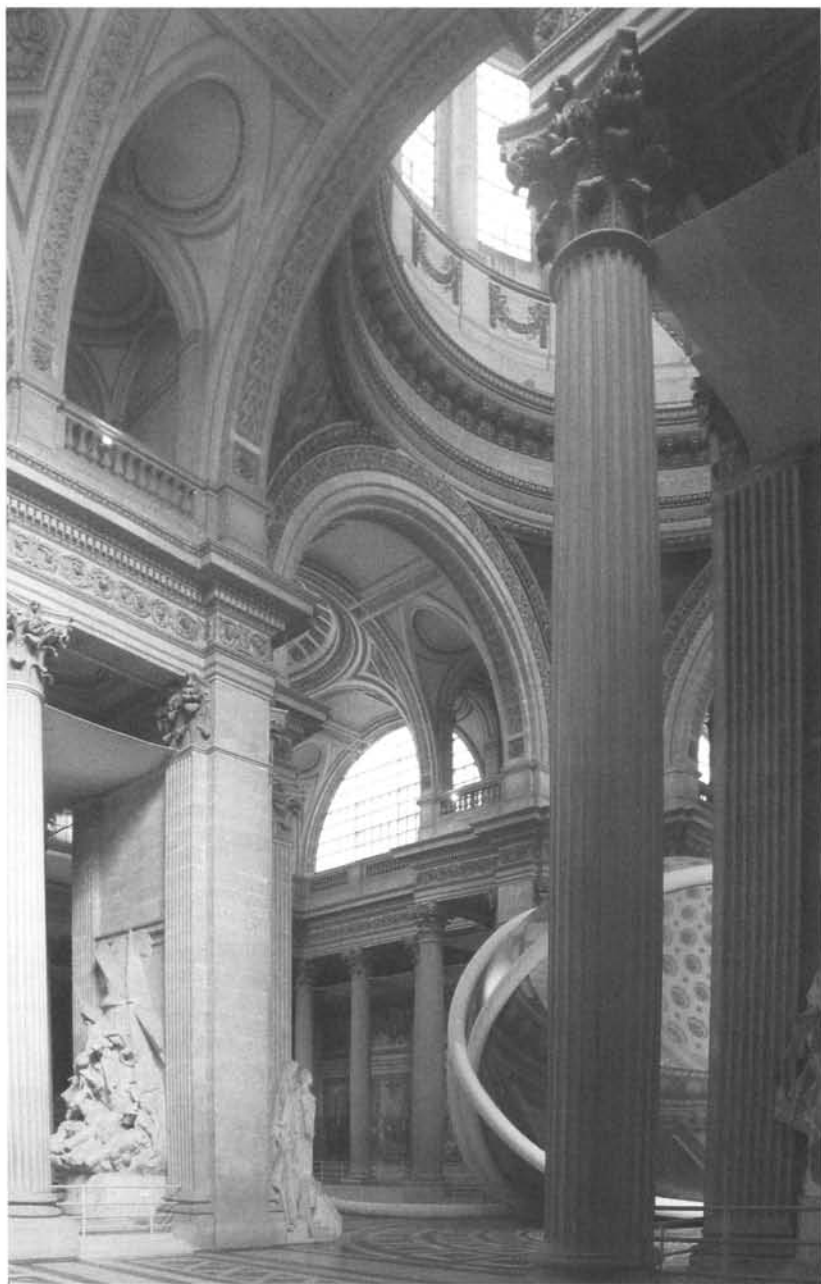
Style: Neoclassical

Dates: 1756–1793

Architect: Jacques-Germain Soufflot (1713–1780)

One of the most serenely beautiful examples of Enlightenment architecture, the Panthéon (formerly the church of Ste-Geneviève) is one of the first modern buildings. Its architect, Jacques-Germain Soufflot, was the first to use advanced mathematics and structural experimentation extensively to minimize the amount of material needed to support a building. Originally dedicated to Paris's patron saint, Sainte Geneviève, a shepherdess who had saved the city from the Huns, Soufflot's building was intended to replace a ruinous Medieval church on an adjacent site. It was secularized after the French Revolution and dedicated to France's greatest cultural heroes, such as Voltaire, the great Enlightenment writer and philosopher, who was the first to be buried in its crypt. Other great Enlightenment heroes followed. Its porch bears the inscription "*Aux Grands Hommes La Patrie Reconnaissante*" (To great men from a grateful country). France continues to honor citizens by interring them in the Panthéon with a great ceremony they call "pantheonization."

Schemes to rebuild the Medieval church had been advanced much earlier, during the reign of Louis XIV, but nothing was done until 1754, when Louis



Built as the church of Ste-Geneviève, Paris' patron saint, the Panthéon (1713–1780) now houses tombs and monuments of France's greatest culture heroes. It was the first building to be designed using scientifically determined structural formulas.

XV, Louis XIV's great-grandson, announced a competition to find an architect. Instead of holding a competition, however, the Marquis de Marigny, general director of the king's buildings—and brother of Madame de Pompadour, the king's mistress—chose his tutor to design the church. Marigny and Soufflot had traveled to Rome and Paestum, in Italy, where the best preserved of all Greek temples are found. Greek temples and the Roman Pantheon, the only Roman building to survive into the modern age virtually intact, heavily influenced Soufflot's designs for the Pantheon, which the king approved on March 2, 1757.

A Revolutionary Design

Soufflot's church was revolutionary, both in plan and construction. It was to be built on a *Greek cross* rather than the customary (in France) *Latin cross* plan. Latin crosses have one long and three short arms of varying lengths, the type of cross used as a Christian symbol, which suggest churches with an obvious front, side, and rear. Greek cross plans have four equal-length arms, and imply four identical sides. To mark the front of his church while retaining the ideal geometry of the Greek cross, Soufflot added a templelike porch, similar to the Roman Pantheon's, with twenty-two columns, each of which is 66 feet (six stories) high. As he developed the plan, he also added a section between the front porch and the *nave* to match a section added to the opposite arm to accommodate the high altar. Thus, his original proposal for a church 275 feet wide, 275 feet long (without the porch), and 275 feet high (to the top of the dome) became an elongated Greek cross plan, 360 feet long (including the porch).

Soufflot wanted his church, especially the dome, to surpass St. Paul's cathedral in London, which Sir Christopher Wren had designed a century earlier. Progress in mathematics and engineering had made it possible to reduce the size of the thick *piers* and walls that Wren and earlier architects had used to counteract the powerful overturning forces the domes exerted on their supports.

Soufflot's dome was unprecedented in construction. The dome of the Pantheon in Rome was an extremely thick mass of brick and mortar; St. Peter's dome and those in Paris it inspired, such as the **Val-de-Grâce** are composed of two superimposed shells—an inner dome to create the appropriate form for the inside of the building and a much taller outer shell to correct for the foreshortening that occurs when a dome is viewed from the outside at ground level. Wren had studied these and inserted a brick cone between the inner and outer shells to support the *lantern* that crowns the dome and lets light into the interior. The cone and several other modifications had allowed Wren to reduce the size of supporting piers, but they are still massive. Like his French models, Wren's inner dome was stone but the outer one was a wooden shell.

Soufflot adopted Wren's three-shell solution, but he wanted his structure

to be consistent and rejected a nonstructural wooden outer and a brick middle dome. All three of the Panthéon's domes are stone and an integral part of the structural system, all three necessary to the stability of the building. Soufflot's most brilliant innovation, however, was to eliminate as many supporting piers and walls as possible and dramatically reduce the size of all others. He proposed a skeletal arrangement of relatively slim, freestanding columns for support throughout the church, an idea he derived from a study of Gothic architecture, which most architects at the time considered "barbaric." Being largely self-taught, Soufflot did not share their prejudices. He admired the economy and clarity of Gothic structural systems. According to his collaborator, Maximilien Brébion, Soufflot's main goal was to combine the lightness of Gothic construction with the purity and magnificence of Greek architecture. Many contemporaries thought it was foolish to try to reconcile such opposite styles. (See **Saint Denis** for an explanation of Gothic structure.)

A Design Requiring Advanced Mathematics

Gothic architects did not, however, have to support immense domes, and Soufflot's is as tall as a modern, twenty-story skyscraper. Significant aspects of the mathematics that Soufflot and his consultants needed to calculate the structural forces exerted by the dome and the size, shape, and location of the structural members required to resolve them did not even exist prior to the seventeenth century. Also, Soufflot wanted to eliminate the *flying buttresses* that Gothic architects used on the exterior of their churches; he considered them to be crutches that ruined the (Greek) purity of the building's form. If he was to avoid them and eliminate or reduce support walls and piers in his building, he needed to calculate how to distribute the weight of the dome over the whole building (instead of just on the piers below it) and how to direct the forces that the dome exerted as vertically as possible. He understood that stone columns are very strong in compression, that is, if forces are exerted straight down on them, but if the forces arrive at angles that make them bend, they can shatter like glass.

Although Soufflot's solution to these conditions requires some engineering background to understand fully, it is easy enough to understand in general terms. First, he shaped the three domes so that their weight, or more precisely the forces they exert, is directed partly straight down on four groups of columns and relatively thin walls under it (that replaced the crossing piers) and is partly directed to a series of stone domes above the four arms of the Greek cross. The smaller domes redirect those forces onto columns under them and in the outer wall of the church. (Soufflot and his advisors cheated a bit and used small, hidden flying buttresses to direct the residual building forces to this outer row of columns.)

No one had tried a structure like this. Like a waiter supporting a tray of glasses on extended fingers, Soufflot needed to know where to place the "fingers" holding up the domes in their building; he needed to know how much

weight they could support, or, rather, the limits to a reduction in their size. Soufflot sought advice from mathematicians and engineers at France's School of Bridges and Highways, which at the time led the world in engineering studies. These early civil engineers, under the direction of Jean-Rodolphe Perronet (1708–1794), set up experimental laboratories to test the stone for its bearing strength, and they created the first accurate mathematical formulas to determine the magnitude and direction of forces in a building of this complexity.

Chronology of Construction

Construction lasted thirty-seven years. Work on the foundations began in 1756, but at least sixty-nine mine shafts, some of them 80 feet deep, were discovered on the site and had to be blocked. The crypt under the church was finished in 1763. For a visit in 1764 by King Louis XV and the Dauphin (the crown prince), the Marquis de Marigny had the porch of the church painted full size on canvas and erected on the building site. By 1776, construction had reached the base of the dome. In May 1778, as construction started on the dome, cracks began to show in the groups of columns and walls directly under it. Even before this, Soufflot's chief critic, Pierre Patte, had published a memo asserting that the central supports were not strong enough to support the dome; he now appeared to be vindicated.

The building probably began to fail for a combination of reasons. Soufflot's structural system may have been too daring, too experimental, with not enough of a margin for error, and the contractor may have substituted softer, cheaper stone for the foundations than Soufflot and his engineers had specified, causing the supports under the dome to shift and the forces in the building to be distributed in uneven ways. Finally, filling the mine shafts under the foundations was probably not enough to stabilize the building site, one of the hills of Paris, which had been a quarry for centuries and was a veritable Swiss cheese of tunnels. In any case, Soufflot died on August 29, 1779, and was, ironically, buried in the crypt of the Medieval church of Ste-Geneviève that the Panthéon was designed to replace. Whether he died of chagrin or other causes depends on the account.

Brébion, Soufflot's student, was named his successor in collaboration with Jean-Baptiste Rondelet and Soufflot's nephew, François. Despite extreme financial difficulties, the building was entirely vaulted and the drum of the dome built by 1787. The dome itself was finished during the first two years of the French Revolution (1789–1790), but as it was nearing completion, new cracks appeared in the central supports and it was feared that the building would collapse. One expert even proposed demolishing the dome. Again, Patte's criticisms appeared to be justified. Finally, between 1806 and 1812, Rondelet was allowed to reinforce the central supports, assuring the solidity of the structure for a time.

Ste-Geneviève Becomes the Panthéon

In 1790, the Marquis de Villette suggested turning Ste-Geneviève into the “Panthéon Français.” He suggested that Voltaire be the first to be interred, and with great pomp, this took place on July 11, 1791. It was, unfortunately, probably not Voltaire that they buried, but the gardener of the abbey of Scellières, where he died. Several “martyrs” of the Revolution were introduced in succession, but they were just as quickly removed as opinions changed. To avoid these embarrassments, it was decided that no one could be “pantheonized” unless they had been dead at least ten years.

Antoine Quatremère de Quincy was commissioned in 1791 to adapt the church to its new secular function. He considered Soufflot’s sculptural decorations to be not only too religious, but also “too gracious,” and had them destroyed. He ordered their replacement by more sober, secular ones, but most were never executed; virtually none of either architect’s decorations still exists. Quatremère de Quincy also ordered the church’s bell towers decapitated, and, inspired by antique temples (above all the Pantheon in Rome), the forty-two ground floor windows blocked so that light came only from above. The symbolism of “enlightenment from above” is obvious, but the intent was also to give the structure a more “funereal” appearance and a “more appropriate gravity.” He also had the glass in the remaining windows “unpolished” to attenuate further the light in the building. Because Soufflot’s structure is physically so light, the interior remains remarkably bright in spite of these changes, but the blank walls of the exterior make the Panthéon a very austere building from the outside.

After the Revolution

In 1806, Napoleon transformed the Panthéon back into a church. The crypt, however, remained a secular burial place. Rondelet executed the marvelous black-and-white pavement of the church, Antoine-Jean Gros painted the huge “Apotheosis of Sainte Geneviève” in the dome, and religious sculpture was added in several places. In 1830, after another revolution, Ste-Geneviève was again secularized into the Panthéon. The new religious sculpture in the pediment was destroyed and replaced by David d’Angers’s secular sculpture (“The fatherland giving to its great men the crowns offered by Liberty”). Though the Panthéon was closed during the entire reign of Louis-Philippe, buildings, including the marvelous **Bibliothèque Ste-Geneviève**, which is as significant a structure in the development of modern engineering as the Panthéon, were constructed around it to create a more regularly shaped setting. Soufflot had designed a street (now called the rue Soufflot) that connected a square in front of the Panthéon to the Luxembourg Gardens. One of the pair of curved buildings he designed to frame the street was built in his lifetime; the other and the rue Soufflot itself were not finished until the mid-1800s.

In 1851, Léon Foucault hung a 40-pound weight on a 220-foot-long steel wire under the dome. Foucault's pendulum, which demonstrated the rotation of the earth, is occasionally reinstalled. In December of the same year, after Louis-Napoleon's coup d'état, the Panthéon became the church of Ste-Geneviève once more. During the siege of Paris in the Franco-Prussian War, the crypt of the Panthéon was used to store powder and munitions. The Prussian army attacked with their cannons and caused severe damage to the dome and vaults. During the uprising after the end of the war, the Panthéon was occupied by the communards and suffered more artillery hits. In 1874, after restoration of the building, its walls began to be covered by a spectacular series of murals illustrating the history of Paris and of France, chief among them paintings by Puvis de Chavannes.

When he died in 1885, the novelist Victor Hugo was so popular that, out of respect for him and his lifelong defense of the Republic, Ste-Geneviève was once more secularized, and the ten-year period of waiting before "pantheonization" was ignored. Hugo was buried in the crypt the same year he died. Existing decorations were retained this time, although one or two were touched up to make them less overtly religious. At the beginning of the twentieth century, statues dedicated to great men, "Diderot and the Encyclopedists" and Jean-Jacques Rousseau among them, were added to the base of the support walls at the crossing.

The Panthéon is again threatened; new cracks are appearing, and pieces of stone occasionally fall to the floor. The building was closed between 1985 and 1995 for a complete structural investigation. Experts concluded that humidity has rusted wrought-iron reinforcing bars threaded through virtually every stone, causing them to expand and crack the stones. It would be prohibitively expensive to disassemble the Panthéon, replace the reinforcing, and remount the building, but no viable alternative has been found. Nevertheless, pantheonization continues. In 1995, the remains of Marie and Pierre Curie were interred, Madame Curie being only the second woman buried in the Panthéon, and in 1996, André Malraux, minister of culture under General De Gaulle, was given a tomb in the crypt.

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PARIS OPERA (PALAIS GARNIER), PARIS

Styles: Beaux-Arts/Eclectic/Second Empire

Dates: 1861–1875

Architect: Charles Garnier (1825–1898)

Second Empire Masterpiece

The Paris Opera is probably the most famous opera house in the world, a symbol of Paris like **Notre Dame** cathedral, the **Louvre**, or the **Sacré Cœur** basilica. Its fame results partly because it is the setting for *Phantom of the Opera* (*Fantôme de l'Opéra*), Gaston Leroux's 1911 novel on which several films and the popular musical were based. It is the most representative building of France's Second Empire and of the "Beaux-Arts" style. Now called the Palais Garnier in honor of its architect, Charles Garnier, the Paris Opera was, when it opened in 1875, the largest, most opulent, and best-equipped opera house in the world. It is 570 feet long and 160 feet wide, and its stage house, which contains the equipment for raising, lowering, and moving scenery, is 200 feet high on the interior, about the height of an eighteen-story skyscraper. Garnier was criticized for making the richly decorated foyers, reception areas, and grand staircase considerably larger than the auditorium, which seats about 1,800 (the new Bastille opera in Paris seats 2,700), but since it opened, the building is nearly as much of an attraction as what is performed in it—sometimes more. Over seventy sculptors worked on the building site, and many more contributed work from their studios. More than thirty-three different kinds of stone, mostly marble, from all over Europe are used in the public areas.

Only this opulence differentiates it from much Modern architecture, which is typically undecorated. Garnier's building was structurally and technologically advanced, and is as "functionalist" as most Modern architects could wish: Each internal part of the opera is clearly expressed on the exterior with a distinctive shape and its own roof. The vestibule and front reception areas are contained in a rectangular block. Behind it, the auditorium is covered with a green copper dome, in front of the much taller block of the stage. Two rotundas project from the sides, the one on the west intended for the entry of the emperor and empress, and the one on the east for the aristocrats who subsidized the opera. A sober block at the rear (north side) of the opera contains administration offices and support facilities (workshops, studios, etc.).



Inspiration for the book, movie, and musical *Phantom of the Opera*, the Paris Opera (1825–1898), now called the Palais Garnier in honor of its architect, is the finest example of the Beaux-Arts style of architecture that represented France's Second Empire.

The Architectural Jewel of Second-Empire Paris

In mid-nineteenth century France, Emperor Napoleon III (Napoleon Bonaparte's nephew) and his chief administrator, Baron Georges-Eugène Haussmann, carried out the most extensive reconstruction of any metropolis in history. Much of Paris was demolished and rebuilt into the "capital of capitals." A new opera was planned as the architectural jewel of the rebuilding of Paris, and a large public square, the Place de l'Opéra, was set aside for it at the end of one of Haussmann's broad new avenues.

According to Garnier's wife, Empress Eugénie (who preferred a design by another architect) asked him: "What style is this? It isn't any style! It's not Greek, nor Louis XVI, nor even Louis XV." To which Garnier replied, "No, all those styles had their times . . . This is the style of Napoleon III—and you complain!" (Fontaine 2001, 19). Whether or not this exchange actually took place, Garnier did consciously create a new style to represent the Second Empire, a style closely related to the eclecticism fashionable among students at Paris's École des Beaux-Arts, the premier school of painting, sculpture, and architecture in the world at the time. In an eclectic Beaux-Arts approach, aspects of various historical periods are combined to create, in the best cases, a new style. In the opera's facade, for example, Garnier combined the *colonnade* from the East Facade of the Louvre; details from Michelangelo's buildings on the Campidoglio in Rome; and Sansovino's library on the Piazza San Marco in Venice, but he did this so skillfully that only a specialist recognizes the sources. Garnier justified this elaborate mix as necessary to command the end of the extremely long vista down the Avenue de l'Opéra from the Louvre and yet remain grand when seen from close.

The Influence of Earlier Opera Houses

Fires caused by the candles used to light performances had destroyed most of the twelve opera houses that had preceded Garnier's in Paris. On average, a Paris opera house had lasted only thirteen years. The next to the last in this series, the Opéra la Montansier, did not burn down, however, but was torn down after the Duc de Berry's assassination in front of it. There had been an attempt on Napoleon III's life at its "temporary" replacement, the opera Le Peletier, which lasted fifty-three years until it, too, burned down. Garnier consequently designed an opera that was as fire resistant as possible and that gave the least opportunity for assassins.

After the attempted assassination of Napoleon III in 1858, a competition was held to choose an architect for a new opera. Such competitions were unusual; French rulers typically chose architects for royal or governmental projects. Of the 171 architects who entered the first stage of the competition, five were chosen to compete in a second round, which Garnier won. Some historians think that Viollet-le-Duc, Empress Eugénie's favorite architect, had proposed the competition in order to eliminate a rival. If he did, his plan failed; his scheme was eliminated in the first stage.

Charles Garnier (1825–1898) and the Problems of Construction

Garnier was young and unknown when he won the competition. The son of a Paris blacksmith, he had been admitted to the École des Beaux-Arts in 1842, and in 1848 won its grand prize, the Prix de Rome, which financed a study trip to Italy, Greece, and Turkey from 1849 to 1854. The Paris Opera was his first work and, since it absorbed his energies for many years, gave him little opportunity to design other buildings. A concert hall for the casino in Monte Carlo (1878–1879) and the Nice Observatory (with Gustave Eiffel) are the best known of his other designs. Nonetheless, he died covered with honors because of his masterpiece.

Construction began in 1862 and continued for thirteen years, slowed by an unexpectedly high groundwater level. Garnier built a huge concrete cistern under the center of the opera to contain it and balance the pressure of the groundwater on the building. Leroux used this cistern as the inspiration for the underground lake in his *Phantom of the Opera*, but it also serves as a reserve water supply in case of fire. To make the opera seem less expensive, government officials asked Garnier to request only half of his first estimate of 29 million francs. The actual cost was 36 million francs, about \$430 million in today's money, and it consequently appeared that Garnier recklessly overspent. (By comparison, the new Bastille Opera cost more than 3 billion francs, about \$600 million.)

Only the facades were completed in time for the 1867 Paris World's Fair, and construction stopped the next year. Nothing was built during the Franco-Prussian War (1870–1871), during which the unfinished opera was used as a military storehouse. At the end of this disastrous war, Napoleon III was over-

thrown and forced into exile. He died in Chislehurst, England, two years later and never saw the completed opera. Construction on the new opera was accelerated when the rue Le Pelletier opera burned, and Marie-Edme-Patrice-Maurice Mac-Mahon, President of the Third Republic, opened it on January 5, 1875. The queen mother of Spain and many international dignitaries attended the gala, but Garnier was not invited and had to buy his own ticket. During the first intermission, however, he was given an ovation by the guests as he walked down the grand staircase. The Opera was an immediate success. All performances were sold out for months, even though ticket buyers knew neither the opera to be performed or who would sing.

Garnier knew that “seeing and being seen,” socializing before the performance and during intermissions, was as important to many operagoers as the performance itself, especially in nineteenth-century Paris. “How big should the these foyers be?” he wrote. “To answer this question one has to study the way people promenade.” He consequently conceived the entire building as a dramatic succession of increasingly elaborate vestibules, foyers, and stairs that lead to the auditorium.

The Grand Staircase

Garnier modeled his sequence of public spaces on Victor Louis’s brilliant **Grand Theater of Bordeaux** (1773–1780), though Garnier’s opera is considerably larger, more complex, and more colorful. At Bordeaux, the vestibule, staircase, and foyers are monochromatic, exposed gray stone. Only Garnier’s vestibules are monochrome; The rest of the public spaces are lushly multicolored, with many kinds of marble, frescoes, mosaics, and gilded details, the first such polychrome spaces to have been built in the center of Paris since the time of Louis XIV. Garnier believed that colors and materials in architecture affect moods in much the same way that chords and keys do in music. Far from confusing operagoers, however, the public spaces lead them naturally and logically, without the need for signs, through the building.

Crucial to this sequence of spaces is the grand staircase, “a masterpiece within a masterpiece,” the sculptural center of a vast multistory, balconied room that explodes upward and in a riot of color beyond the relatively low-ceilinged, colorless vestibules. The drama of the stairhall was greatest for the wealthiest patrons, who entered through the east side pavilion at street level, one story below the bottom of the main stairs. It is still an awesome experience for most operagoers, who enter the front of the building, after climbing a flight of stairs, into a lower vestibule. From there, a second set of stairs opens into a broad, low vestibule. From it the operagoer enters the stairhall and joins with the wealthy subscribers to mount a broad, single flight of stairs that ends in a landing in front of the main entrance to the auditorium. Two narrower flights of stairs lead up from this landing, at right angles, to the next floor, on which the intermission galleries are located. The spectacle of operagoers arriving or leaving can be observed from rings of balconies around the staircase, which Garnier designed to resemble boxes

in the auditorium. (Upper-level seating is reached from sets of plainer stairs to either side of the stairhall.) Garnier's genius in designing the staircase was to recognize that people do not walk around corners at right angles but in smooth curves. He therefore designed not only the sides of the stairs as curves, but he also shaped each tread differently depending on the direction from which someone climbing or descending the stairs approached or left it (for example, to turn a corner onto the next flight of stairs). Because of this and because Garnier carefully calculated the height of the risers and the depth of the treads, an operagoer can walk up or down the stairs without looking down. This was particularly important for nineteenth-century women, who wore long dresses and could not see their feet, but it lends a sense of elegance to all who use the stairs. Everyone uses these stairs, at least up to the level of the intermission lobbies, making even the least-wealthy patron feel, at least momentarily, like an aristocrat. Only the emperor and empress did not use the main stairs to enter the auditorium. To minimize exposure to the public, that is, to avoid a second assassination attempt, Napoleon III demanded that he and the empress be driven up a ramp and inside the building to a room from which they could go directly to the imperial box without crossing the public's path. After the emperor's exile, this entry, the domed pavilion on the west side of the opera, was remodeled into the opera's library and museum. Two bronze eagles on the exterior, the traditional symbol of emperors, remain as reminders of its original function, and in 1903, a large monument to Garnier, comprising a bronze bust and plan of the opera, was erected in front of it.

Subscribers, the wealthy patrons who subsidized the opera, entered through the east rotunda of the building. They, too, entered directly from their carriages into a plain vestibule that, initiating the drama of arrival, opens onto an enchanting, mirrored, circular peristyle directly under the auditorium. Garnier signed his name around the base of the peristyle's domed ceiling in what appears to be Arab calligraphy, but which upon close inspection floridly spells out: "Jean-Louis Charles Garnier, architecte, 1861–1875." From this peristyle, subscribers entered a second vestibule and faced, under the first flight of the main stairs, a bronze statue called "La Pythonisse," one of the few works in the building not commissioned specifically for the Opera and the only one created by a woman. Garnier bought it at the Artists' Salon of 1870. Though signed "Marcello," the sculptor was the Duchess of Castiglione-Colonna. She used the masculine pseudonym because a woman, much less a noble woman, even though a friend of the architect, would not have been taken seriously as an artist by the general public at the time. To the left and right of the Pythoness are stairs leading to the base of the main stairs.

The Auditorium

Garnier borrowed the overall form of the auditorium—a dome supported on pairs of columns connected by large arches—from the earlier Le Pelletier

opera, but instead of separating seating areas into booths (loges), Garnier created continuous horizontal sweeps of open balconies. This arrangement is consistent with his overall idea of making the audience the spectacle until the overture shifts attention to the stage, of which nearly 200 of the seats in the auditorium have no view. A rear section in each group of seats can be curtained off, a requirement during the Second Empire, when a woman accompanying a man was not necessarily his wife and was not necessarily with him to watch the performance.

Although the auditorium appears to be supported by a traditional masonry structure, in reality there is an advanced iron construction under the marble and gilded stucco. An iron structural frame allowed Garnier to support the dome and balconies with fewer and thinner supports than with masonry and to improve acoustics and views to the stage. Even with a fire-proofing layer of brick and cement mortar and the marble coverings, the twelve cast-iron columns, each 80 feet tall, are only about 3 feet square. Garnier also used an iron skeleton to frame the dome. In 1964, a new painting on canvas by the modern painter Marc Chagall was installed in it (on a removable frame) over the original nineteenth-century Neobaroque painting that Garnier commissioned for the interior of the dome. Chagall's painting, which has scenes from the operas of fourteen composers—Moussorgsky, Mozart, Wagner, Berlioz, Rameau, Debussy, Ravel, Stravinsky, Tchaikovsky, Adam, Bizet, Verdi, Beethoven, and Gluck—is praised by some, and by others considered a false note in Garnier's carefully orchestrated interior. Though the 7-ton chandelier that hangs from the center of the dome never fell, as in Leroux's *Phantom of the Opera*, one of its counterweights did fall and crush a spectator in the fourth balcony—who was sitting in seat number 13.

The Grand Foyer and Its Lobby

All spectators promenade in the same reception areas during intermissions. A broad hallway with a mosaic ceiling, the first of its type in France, overlooks the grand stairs. At one end is a round room, the room of the sun, which has a gilded ceiling and gilded mirrors on the walls, and at the other end is the room of the moon, identically shaped, but with silvered ceiling and mirrors. It was intended as preparation for the iced deserts to be served beyond, but in the rush to finish decorations for the opening of the opera, the decorations of the sun and moon rooms were transposed.

On the opposite side of this mosaic hall from the main stairs is the most lavishly decorated sequence of rooms in the entire building, the Grand Foyer, which stretches across the entire front of the opera. Reminiscent of the Hall of Mirrors at **Versailles**, it has a high, vaulted ceiling divided into panels by an elaborate architectural framework. Covering more than 5,000 square feet, these panels are the masterpieces of Paul Baudry, which took him nine years (1866–1874) to finish.

Technical Innovations

Garnier covered the iron skeleton of the opera with noble materials in the public areas because of iron's utilitarian association and the need to fire-proof the iron, but he exposed it in the rehearsal and attic spaces and designed every detail there as carefully as he did the marble and gilt moldings. He spent months studying the acoustics of the great opera houses of Europe and reading every available text on the subject. Garnier responded modestly to praise for the auditorium's acoustics, saying that they "are excellent thanks to heaven . . . but absolutely not to me." Heating and ventilation systems and the stage machinery set the standards for decades.

Garnier's Principle of "Artistic Unity"

Garnier, like the great German composer Richard Wagner, believed that what he called the "unity of artistic creation" should be the major goal of the arts. Wanting the sculptures, paintings, mosaics, tapestries, and architecture to join with drama, dance, and music to create a complex whole, Garnier chose artists who shared his vision of the opera as a collaborative work. He knew most of them from his student days. Eighteen different sculptors worked on the facade, which features busts of famous composers and librettists, and of mythological figures who represented music, drama, song, and dance. Nudity and the androgynous character of the central figure in Jean-Baptiste Carpeaux's "La Danse" (lower right arch of the facade) caused a scandal at its unveiling; now considered a masterpiece, it has been moved to the Musée d'Orsay in Paris and replaced with a copy. Garnier insisted on uniform quality. He wanted sculptures that few would ever see to be as fine as those near the entrance, and most are. For example, little more than the silhouette of Eugène-Louis Lequesne's "Fame holding the bridle of Pegasus," one of the two nearly identical rearing winged horses anchoring the gable ends of the stage house, can be seen from the ground, but it is a superb work of art. Only the administration block at the rear of the building is unornamented, which is appropriate given its business function.

Despite its many innovations, its popularity with the public, and its acoustical excellence, Garnier's opera was not admired by everyone, and he wrote a book (1876–1881), *Le Nouvel Opéra de Paris*, to defend his work. During much of the twentieth century, the Paris Opera was considered to be in bad taste by Modernists, but tastes have changed again, and the Palais Garnier has been beautifully restored. Performances are still usually sold out, regardless of what is being performed.

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PETIT TRIANON. *See Versailles: Petit Trianon.*

PIERREFONDS: CHÂTEAU, BETWEEN SOISSONS AND SENLIS

Styles: Medieval and Romantic

Dates: Circa 1390–1407; restoration 1857–1884

Architects: Jean le Noir and others for Duc Louis d'Orléans; restored by Viollet-le-Duc (1814–1879) and Maurice Ouradou (1822–1884) for Emperor Napoleon III

Pierrefonds incorporated a unique and highly developed system of defense when it was built at the end of the Middle Ages. It occupies a place in the history of French military architecture as important as the less well-preserved castle of Coucy-le-Château and the fortress city of **Carcassonne**. Advances in artillery, however, made the castle obsolete almost as soon as it was completed. It achieved new significance when the great French architect Viollet-le-Duc rebuilt it in the mid-nineteenth century for the emperor Napoleon III. This rebuilding—it is more than a reconstruction—represents, better than almost any other building, nineteenth-century Europe's Romantic conception of the Middle Ages. It inspired the young Bavarian king Ludwig to build his fantasy castle of Neuschwanstein, which in turn was a major inspiration for Walt Disney's Fantasyland castle. Ironically, the castle at Disney's European theme park is only a short drive from Pierrefonds.

Viollet-le-Duc has often been criticized for the liberties he took with what he called “one of the most beautiful and curious monuments possessed by France,” but he was required to meet the demands of the emperor for a princely residence with nineteenth-century comforts. Viollet did change some significant details in his rebuilding, but it is also true that without him,



Pierrefonds is a genuine, though late, Medieval castle, built around 1400. Ruined in the seventeenth century, it was imaginatively restored (1857–1884) by Viollet-le-Duc for the Emperor Napoleon III. It inspired several later Romantic castles, especially Ludwig II's Bavarian castle Neuschwanstein.

we would most likely have only picturesque ruins in an advanced state of decay. It is also true that recent scholarship has blunted some of the criticism of Viollet's restoration, especially of the exterior. Many of his restorations are closer to what probably was there than previously thought. Within the buildings arranged around the insides of the defensive walls, Viollet created a "modern" residence for a mid-nineteenth-century monarch, but the exterior is a relatively faithful recreation of the Medieval chateau.

The Site and Its History

Not much is known about earlier castles on the site, a spur of land at the edge of the forest of Compiègne halfway between Soissons and Senlis. This area was integrated into the king's domain only at the end of the twelfth century. In 1284, King Philip III united several fiefs within the area and gave them to Louis d'Orléans, second son of King Charles V, when he was born in 1371. As the Count de Valois, he took possession of Pierrefonds in 1406, at which time he was elevated to the title of duke.

In 1390 when Duke Louis commissioned Pierrefonds from Jean le Noir, architect to the king, he and his younger brother were in a bitter struggle with their uncles for control of the realm, King Charles VI having become mad. Construction was begun by 1392, and well advanced by 1397. Pierre-

fonds was sufficiently complete in 1406 to serve as the setting for a marriage feast for Louis's son Charles, but Louis was assassinated the next year by Jean sans Peur (John the Fearless), Duke of Burgundy, and he never saw it finished. It successfully withstood a siege by the Burgundians in 1411, but later that year, Charles was forced to sell the chateau to the king's representative, the Count de Saint-Pol. Two years later, reconciled with the king, Charles was permitted to repossess Pierrefonds, but before the Count de Saint-Pol turned it over, he set it on fire; roofs and attics suffered extensive damage. In revenge for this and his father's death, Charles attacked the Burgundians, but was taken prisoner in 1415 in the battle of Agincourt and sent to England, where he remained for twenty-five years. Freed in 1440, he went to Blois, not to Pierrefonds, which he nevertheless had repaired and left to his son, who was crowned King Louis XII in 1498.

His cousin and successor, King François I, otherwise a great patron of architecture (see entries for the **Louvre** and **Chambord**), apparently made no significant changes to Pierrefonds. It passed through several hands until it was taken over by Antoine d'Estrées, father of King Henri IV's beautiful mistress, Gabrielle. In 1588 or 1589, it was occupied by enemies of the king. Artillery used in attempts to retake it did nothing more than "whiten the walls," but a siege of the castle ordered by King Louis XIII in 1617 did much more damage.

Picturesque Ruins

Richelieu, King Louis XIII's minister of war, attacked with 3,000 soldiers and powerful cannons. The bombardment lasted less than a week and resulted in the collapse of the *donjon*, the central tower of the fortress. Once he had taken it, Richelieu ordered the castle's defenses dismantled. A lack of funds and the quality of the construction halted demolition before it was complete, and the resulting ruins attracted visitors throughout the eighteenth century, when ruins were particularly appreciated for their "picturesque" qualities. Louis XVI visited in 1788. Ten years later, after the French Revolution, the ruins were declared national property and sold for 8,100 francs. Napoleon bought them in 1810 for a mere 2,950 francs. He may have thought to restore them, but this is undocumented. King Louis-Philippe had the courtyard of the fortress cleared in August 1832 for a banquet celebrating the marriage of his daughter to Leopold I, King of the Belgians. After Pierrefonds was added to the list of historic monuments in 1848, archeological excavations were begun, and a series of guides and pamphlets published to encourage tourism. Prince-President Louis-Napoléon visited the ruins in 1850; in 1857, by then the Emperor Napoléon III, he commissioned Viollet-le-Duc to restore the chateau as one of his residences.

Viollet's Restoration

Viollet was one of the best archeologists of his time, as well as a famous architect, writer on architectural theory, and the preeminent scholar of

French Medieval architecture. He ordered excavations and prepared meticulous studies of the original appearance of the castle, in the process discovering and recording vestiges of previous fortresses.

Viollet wanted to rebuild only the donjon, the great central tower, as “a very pleasant dwelling in the middle of picturesque ruins,” but Napoleon III ordered a series of changes that resulted, by 1861, in rebuilding the entire chateau. By the mid-1860s, more than 100 men were working on the project, even on Sundays. Most of the construction was finished by 1870, when the Franco-Prussian War halted work—and Napoleon III’s reign. With the motivating force behind the restoration in exile, work resumed slowly. It was incomplete at Viollet-le-Duc’s death in 1879. His son-in-law, the architect Ouradou, took over direction of the project. Decoration and furnishing of the interiors were never completed.

Dismissed as a fantasy palace for a discredited ruler, Pierrefonds remained empty, used by the local community for occasional celebrations and as a temporary hospital and army casern during the First World War. It became a popular tourist attraction when, after World War II, the French service of historic monuments repaired the castle and set up expositions to explain its history.

The Exterior

Although 80–100 feet above the surrounding valleys, Pierrefonds’s site is well below the plateau to which it is connected by a narrow spur of land. This military weakness required cannon emplacements at the edge of the plateau to allow defenders to fire down on attackers attempting to cross a deep moat and drawbridge that separated the castle from the land approach.

The outer walls of Pierrefonds describe an irregular rectangle—one side is bent outward in the middle—roughly 340 feet by 290 feet, about the size of a typical U.S. city block. Typical of French castles, the rectangle is oriented with the corners, not the sides, toward the cardinal directions. Eight towers, about 125 feet high, are arranged around the walls. The four at the corners are cylindrical; three of the four centered on the walls between them are semicircular; and the tower at the bend in the fourth side contained the castle chapel on its ground floor. The towers were dedicated to eight of the Nine Worthies, first listed by Jean de Longuyon in his early fourteenth-century *Voeux du Paon* (Vows of the Peacock): three were classical heroes (Julius Caesar, Hector, and Alexander the Great), three were Medieval (Godfrey of Bouillon, who led the first Crusade; King Arthur; and Charlemagne), and three were from the Old Testament (Joshua, Judas Maccabeus, and David). All but David have towers dedicated to them, identified by statues of the heroes in niches on each tower. Only two of these statues, much restored, are original. The largest tower, dedicated to Caesar, was next to the main entry to the castle in the center of the southwest side. Except for a rectangular tower that Viollet had included in some of his early drawings, he re-

constructed the exterior of the castle substantially in its original form. It is not apparent why he did not rebuild the rectangular tower, which either flanked or was above the entry door, but this side of the castle was the part most heavily damaged in the 1617 attack, and consequently the most speculatively restored. Though most of the Caesar tower and adjoining wall had collapsed, only parts of the other four sides had been burned, pulled down, or blown up, so that walls and towers survived, minus roofs, to their full height in several places.

In addition to the main entry, there were two postern (secondary) gates. One on the northeast side opened outside the castle walls onto the “*lices*,” a parade ground for exercise and games, probably also for the stables and other service functions. Viollet added a series of walls, gates, and moats that had never existed but corresponded to the emperor’s fantasies. A much larger southeastern postern gate, between the donjon and the chapel, opened into a courtyard for storing provisions. It could be sealed off from the rest of the chateau in case of attack. Viollet rebuilt it as the emperor’s carriage entry, again adding more fortifications, drawbridges, and arrow slots that would never have existed in a military fortress.

The system of double parapet walks crowning both towers gives Pierrefonds its unique silhouette. They had been proposed for other castles, but never built as consistently as here. The lower parapet walk (*chemin de ronde*), supported on *corbels* (stones projecting from the walls), combines (as was conventional) arrow slots and windows from which to fire crossbows and holes in the walkway floors (*machicolations*) through which to drop objects or fire on attackers trying to sap (undermine the foundations of) or climb the walls. It was also covered with a roof to prevent attackers from using ladders to climb onto the chemins de rondes. The innovation was the second walkway, which was set back from the first, but still supported on corbels in front of the main wall. Defenders could fire from it on any attackers trying to break through the roof of the first.

There was a third level of protected walkways on the Julius Caesar and the Alexander towers (on the middle of the northwest side). Viollet believed them to be lookouts and perches from which the officers gave orders. Not everyone agrees with his reconstruction of their tops, especially of the tall observation towers, which look like chimneys, that are attached to the Charlemagne and Caesar towers. Documents from the Middle Ages suggest, however, that his reconstructions are at least reasonable.

Viollet also quite reasonably, though imaginatively, restored internal circulation (stairs, hallways, terraces, and ladders) between these towers. For example, the upper chemin de ronde is connected with the lower, and that would have allowed defenders to make a continuous circuit around the top of the walls of the castle without interfering with the active defense of the fortress. In earlier designs, by contrast, towers were considered independent strongholds; defenders lost time in coming to each other’s aid and were ex-

posed when moving from one tower to the other. As noted earlier, improvements in artillery rendered this most perfect of Medieval castles obsolete soon after completion. Pierrefonds's 20-foot thick walls were built to resist undermining, but were no defense against modern cannons, as the 1617 siege proved.

Inside the Defensive Walls

Viollet-le-Duc restored the main entry with a drawbridge leading to two openings (a large one for carts and another 2 feet wide for pedestrians), each of which could be closed by a *portcullis*. Past them was the castle courtyard with a range of buildings around its northwest, northeast, and southeast walls. To the right of the entry, on the inner face of the Caesar tower, was the donjon, the squarish fortress tower where the lord lived. In principle, it was also the most secure part of the castle, the place of last resort in a siege. In most earlier castles, the donjon had very small windows—arrow slots—and was physically isolated from the rest of the fortress by a second moat. Pierrefonds's donjon was physically incorporated into the general system of defenses, which made it less secure: If the castle fell, the donjon would, too. When Viollet-le-Duc rebuilt it as Napoleon III's private palace, he added a grand entry stair, enlarged the windows, and created sumptuous interiors; most vestiges of the donjon as the most secure part of a fortress disappeared. Nonetheless, Viollet used the foundations and one surviving wall with its fireplaces to re-create the general massing and shape of the original.

As this implies, the Medieval donjon had been almost completely demolished in 1617, so Viollet's rebuilding is the most speculative part of his work at Pierrefonds. It is, however, clear that Pierrefonds's donjon was not the austere keep of earlier castles, but a relatively comfortable residence with its own chapel. Even as originally built, the windows were larger than customary and the rooms were arranged more for comfort and convenience than to garrison soldiers in a last defense. The outer walls of Pierrefonds had been made exceptionally secure so that the interior could be more comfortable, a conclusion reinforced by the amount and quality of sculptural decoration.

Viollet's Interiors

Napoleon III, who considered himself an expert on military sieges, had, in effect, commissioned a sumptuous monumental "toy" from Viollet. Criticism at the time that he wanted a fortress in case of political troubles is absurd. Neither the original castle nor—especially—Viollet's rebuilding could have been defended against modern weapons. Napoleon III was a Romantic in a period when his sort of Romanticism was no longer fashionable in France. He had also commissioned a "Gothic" railroad car from Viollet, and he originally wanted the **Paris Opera** to be in a "Gothic" style.

Viollet probably shared little of his patron's Romanticism. As with his other restorations, his occasional replacing of authentic Medieval aspects of a building with ones of his own imagination (see the entry on **Notre Dame**) has been criticized by modern scholars. But he was a scholar and archeologist in the modern sense and, above all, he was the preeminent theorist of modern architecture, who argued strongly for a modern architecture based on iron construction. His fairy-tale reconstruction of Pierrefonds responded to his client's command. In one respect, Pierrefonds was far more advanced than the clients realized; though well integrated with historically accurate decorations, many of Viollet's interior details clearly anticipate turn-of-the-century Art Nouveau decorations.

Only three rooms on the main floor and one on the floor above it were decorated and partially furnished before work was stopped. Empress Eugenie's bedroom, directly above Napoleon III's, is perhaps the most successful of all Viollet's interiors, but the chapel demonstrates his virtuosity in creating an original "Gothic" architecture. There is no Medieval model for it. Although he first designed an archeologically correct reconstruction of the chapel, in his final design, he kept only the chapel's plan. He added a complete upper floor, originally the arsenal, which was destroyed in 1617. It has a large tribune (a sort of balcony level) and above that a gallery, both of them built into the walls. Gaudran's facade decorations were completed after Viollet's death and are not as inventive as his chapel.

Viollet's least accurate (and least well executed) part of the restoration is the gallery he added to the buildings on the northwest side of the court. Of indeterminate style and mediocre in detail and decoration, it had never existed, as Viollet knew very well. Also Viollet's invention, but more successful, is the grandiose Renaissance-style staircase in the north corner of the courtyard that goes from the two basement levels to the upper floors.

Viollet rebuilt the rooms on the northwest (originally, perhaps, kitchen and dining hall) as three large rooms on ground level, and above them one of Viollet's masterpieces, the Hall of the Nine Worthy Women (*Salle des Preuses*). Immense—160 feet long and 30 feet wide with a very high ceiling—it is wood-paneled. Although it seems desolate and bare today, it was conceived (as old photographs show) not only as a concert hall and ballroom, but as a museum of Medieval weapons, which were arranged in panoply along the walls. Statues at both ends of the hall, sculpted by Gaudran to Viollet's designs, were intended to evoke Medieval chivalry. The nine statues above the great fireplace at the end of the hall represent the nine female "worthies," counterparts of the male worthies of the exterior towers. Viollet gave Semiramis, in the center of the group, the face of Empress Eugenie, and the other ladies the faces of her friends at court. No doubt the emperor was amused. (The list of Nine Female Worthies varied from author to author, unlike the Nine Male Worthies of Jean de Longuyon's *Voeux de Paon*, mentioned previously.)

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PLACE DE LA CONCORDE AND GARDES MEUBLES, PARIS

Style: Neoclassical

Dates: 1762–1768

Architect: Angès-Jacques Gabriel (1698–1782)

The Place de la Concorde is one of the most famous and influential urban spaces in any city in the world and the heart of urban Paris. It is the centerpiece, the midpoint of the Grand Axis that begins with the **Louvre**, continues through the Tuileries Gardens, up the Champs Élysées (Paris’s “Main Street”), past the **Arc de Triomphe**, and ends, visually at least, miles further to the west of the city in the immense new **Grande Arche**. Originally, however, the Place de la Concorde was at the very edge of Paris, a square for promenading called the Place Louis XV. Paris aldermen conceived it in 1748, as a way to honor and curry favor with King Louis XV the “Well Beloved,” whose equestrian statue they placed at its focal point.

Two competitions for design of the square were held, one in 1748 after the Peace of Aix-la-Chapelle, and a second in 1753. Only the most eminent designers were involved in the competitions, especially the second, which was reserved for members of the Royal Academy of Architecture. Angès-Jacques Gabriel, the king’s official architect, was commissioned to combine the best ideas of the entrants, and in 1755, his project was accepted. Most of the land for the new square was owned by the king, the rest by the heirs of John Law, the banker involved in the “Mississippi Bubble” scandal. They finally agreed to cede it in exchange for building sites on the northwest corner of the new square and on both sides of a new street, the rue Royale, that was planned to extend from the center of the north side. They also agreed to construct the facades of buildings on these plots of land according to designs prepared



The Gardes Meubles (1762–1768) were designed by Ange-Jacques Gabriel to define the north side of the Parisian square originally created to honor King Louis XV. Renamed the Place de la Concorde in the 1800s, the square was the site of the guillotine during the French Revolution.

by or agreed to by Gabriel. Behind the facades, Law's heirs could build much as they wished.

The Architect

Ange-Jacques Gabriel was, by general consensus, the greatest architect in eighteenth-century France and one of the most talented in Europe. Chief among his works were interiors for the palace of **Versailles** and the Petit Trianon, the jewel of eighteenth-century architecture, in the palace gardens. He had succeeded his father as First Architect to the king in 1742, and remained in that position until the day after Louis XV died. Early in his career, he had designed in the light, delicate, decorative Rococo style, but gradually, especially due to the influence of the king's sophisticated mistress, Madame de Pompadour, he turned to the more restrained Neoclassical style he used for the buildings of the Place de la Concorde.

The Essentials of Gabriel's Scheme

The site for the new square was large—more than 25 acres at the western edge of the Tuileries Gardens, the formal gardens of the Louvre designed by Andre Le Notre (see entries for the Louvre, Versailles, and **Vaux-le-Vicomte**

for more on Le Notre). Its southern edge was the Seine River, and on the west were the forests through which the Champs-Élysées led out of Paris. The north side was where the city aristocrats were beginning to build mansions. Unlike most city squares, which were defined on at least three sides by buildings, the Place de la Concorde could be defined by buildings only on one side, the north. Gabriel proposed two magnificent new buildings, the *Gardes Meubles* (royal furniture storehouses) to limit private development and create a royal facade for the square. Otherwise, he used nonarchitectural means to create and direct views out of the square.

Using parts of his fellow architects' competition entries, Gabriel planned the square around the axis that Le Notre had created, an avenue of trees extending from the (now demolished) Tuileries Palace, the western wing of the Louvre, to the Chaillot hill in the west where the Arc de Triomphe now stands. He then intersected a new north-south axis with it and placed an equestrian statue of Louis XV by Bouchardon on the intersection. Gabriel's *Gardes Meubles* framed the extension of the new north-south axis into a new street, the rue Royale, which would end in front of a new church, eventually built as the **Madeleine**. An existing promenade along the banks of the Seine to the west, the Cours de la Reine, was extended by Gabriel into the southwest corner of the square. Rules of symmetry required that this street, which crosses the main axes at an angle, be matched by three more entries at the other corners of the square. The axes of these four diagonal streets intersect with the north-south axis at two points, later marked by fountains. By cutting off the corners where these streets enter, Gabriel created an octagonal form, which he made into an island by surrounding it with a deep, dry moat and a balustrade. He proposed statues at the ends of the bridges that connected this island with the streets around the square, but only bases for the statues were finished in Gabriel's lifetime; the statues were added much later.

Work on the square began in earnest in 1762. Bouchardon's equestrian statue of Louis, finished by the sculptor Pigalle, was dedicated on February 23, 1763. The place was mostly complete by 1772, though additions and modifications would continue for decades.

Architectural Details

To suggest a continuity with the glorious reign of the Sun King, Louis XIV, Gabriel used characteristic features of Claude Perrault's design for the East Facade of the Louvre for his facades. Like Perrault, he used a *colonnade* of freestanding columns as the major feature, though Gabriel used single columns instead of pairs. He also eliminated the Louvre facade's central pedimented *pavilion*, which the Abbé Laugier, in his 1753 *Essai sur l'architecture*, had condemned as illogical: A *pediment* should represent a gable roof at the end of a building. Gabriel's pediments, only on the ends of the Gardes Meubles facades, could be interpreted as the ends of wings perpendicular to

the main block. This sort of argument, which may seem pointless to us today, is, however, very representative of the architectural thinking of the time. Also a reflection of the age of Louis XV, Gabriel's facades are much more elegant than Perrault's; their details are crisper and their proportions more slender.

Gabriel's elimination of a strong center made the individual facades look unbalanced and incomplete according to conventional rules of composition. Gabriel did design a center for his composition, however: the church he proposed to end the rue Royale. The Gardes Meubles would "inflect" to it, drawing this distant object into the place. (This kind of clever "inflected composition," characteristic of Rococo design, has recently become fashionable again.) Later architects built on Gabriel's idea. When it was finally built, the facade of the church, the Madeleine, was designed to repeat a classical temple facade that had been added after the French Revolution to transform the Palais Bourbon into the seat of the National Assembly. This interplay of similar facades at the opposite ends of the Place de la Concorde's cross axis added a level of sophistication to Gabriel's design that parallels the interplay between the two triumphal arches along the main axis. Gabriel's refined monumental facades, which were finished by 1775, are now considered, along with the Petit Trianon, the finest examples of the Louis XV style. They were, however, poorly received by contemporaries.

Subsequent Modifications to the Place de la Concorde

By the end of the eighteenth century, the Left Bank of the Seine, opposite the Place Louis XV, was rapidly becoming a fashionable residential quarter, and a bridge was proposed. Since 1777, Jean-Rodolphe Perronet, the great civil engineer, had worked on a scheme connecting the Place Louis XV with the Left Bank. For financial reasons, it was not begun until 1788, a year before the French Revolution. After the Revolution, some of the stones from the Bastille prison were used in constructing the bridge so that "the people could continually trample the prison under foot." The Pont de la Concorde was widened in 1930.

In 1792, the revolutionaries toppled the equestrian statue of the king, and the place was renamed the Square of the Revolution. On January 21, 1793, a Sunday, the guillotine was set up near the northwest corner of the square to execute Louis XVI. It was moved across the square on May 13th, close to the grille at the entrance to the Tuileries Gardens. During the next two years, 1,343 victims, including Marie-Antoinette, Madame du Barry, Charlotte Corday, Danton, and Robespierre were beheaded there. In 1795, the square was rebaptized Place de la Concorde, the place of concord or agreement, echoing Louis XVI's final words, "May my blood consolidate the happiness of France."

The east Garde Meuble, originally the royal furniture warehouse, was turned into the Admiralty Office (the Hôtel de la Marine) in 1792. The west

building, which originally had four private mansions behind the facade, has been occupied by the French Automobile Club and the luxurious Hotel Crillon for more than a century. In 1776, further to the west, Benjamin Franklin and other Americans signed the Treaty of Friendship and Trade between King Louis XVI and the thirteen colonies that recognized the Independent States of America. The American Embassy now occupies the site. Some of the original interiors of the Gardes Meubles are now in the Metropolitan Museum of Art in New York.

Fearing that any commemorative statue would be the focus of future uprisings, King Louis-Philippe ordered an Egyptian obelisk he had received as a gift from Mohammed Ali, Viceroy of Egypt, to be erected at the center of the square. (The obelisk, one of a pair that had stood for 3,300 years in front of the temple at Luxor, had actually been given to King Charles X in 1829, but it arrived four years later, during the reign of Louis-Philippe. The Egyptians were given a clock in exchange.) Relief sculptures on the base of the obelisk are modern and show the impressive engineering feat of transporting the 75-foot-tall, 220-ton obelisk from Egypt and setting it upright. The architect Hittorff added the fountains at the intersection of the diagonal axes with the north-south axis. He also added light fixtures and decorative columns, and he commissioned eight statues representing towns of France for the pedestals that Gabriel had designed for the bridges over the dry moats, which were filled in during the Second Empire. The Place de la Concorde is now a major vehicular traffic roundabout in Paris, making it difficult to appreciate its urban and aesthetic qualities.

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PLACE DES VOSGES, PARIS

Style: Renaissance

Date: Designed 1605

Architect: Uncertain; perhaps Claude de Chastillon

The Best-Loved City Square in Paris

The Place des Vosges (originally the Place Royale) has been one of the most famous and admired public spaces in Paris since its creation 400 years ago, beloved by Parisians and tourists alike. An oasis of calm in the densely built, noisy neighborhood of the Marais quarter, its almost square shape, created by four sides of nearly identical stone-trimmed brick townhouses is a contrast to the irregular warren of streets around it. A palpable sense of relief is felt upon entering the square through archways on the ground floors of the buildings in the middle of its north and south sides.

On their exteriors, the buildings around the square have changed little, but the trees and lawns of the tranquil park in the center are a relatively recent addition. When it was inaugurated on April 5, 6, and 7, 1612, for the wedding of King Louis XIII and Anne of Austria, the Place Royale, as it was originally called, was a featureless, sanded, open space surrounded by the brick houses. Viewing stands for the 10,000 spectators at the wedding festival were temporary, but the sanded lot remained for decades as a place for festivals and parades. An equestrian statue of Louis XIII was placed in the center of the square in 1639. Diagonal and crosswalks added about 1665 divided the open square into eight triangular lawns that were separated from the houses by broad carriageways and a wooden balustrade. In 1682, the wood fence was replaced by an iron grille with gates to which only residents had keys, but a proposal to install “a garden as it should be”—that is, a garden like Le Notre’s at **Versailles**—was never carried out. In 1872, elms were substituted for the linden trees, planted during the reign of Louis XVI, that were arranged around several old chestnut trees. Most of the elms were diseased by 1975, and a French-style garden was proposed again, and again rejected in favor of replacing the diseased trees.

King Henri IV as an Urban Planner

Henri IV (reigned 1589–1610) set about “embellishing the kingdom,” in particular Paris, as soon as he was crowned. In addition to the Grand Gallery connecting the **Louvre** with the Tuileries palace and the Pont Neuf (the “New Bridge”), he proposed three squares for a city that had little civic open space. All were to be developed by selling the land around them for houses that had to be built to the designs of a royal architect. The Place de France, a grand, semicircular piazza, remained on paper, but the Place Royale and the Place Dauphine, a triangular square next to the Pont Neuf, were constructed according to plan and immediately successful, though the Place Dauphine has since been extensively rebuilt. They set the precedent for many future developments in Paris, including the rue de Rivoli and the Place Vendôme.

The Origins of the Place des Vosges

The Place Royale, renamed the Place des Vosges in 1800, in honor of the first French department to pay its taxes after the French Revolution, was built



The best loved of the Parisian squares, the Place des Vosges (originally Place Royale) was built during the Renaissance (1605) on the site of an abandoned royal palace in the Marais district.

where, in 1559, King Henri II was fatally wounded during a tournament held near the Hôtel de Tournelles, his preferred palace. It thereafter became abhorrent to the queen, Catherine de Medici, who abandoned it. Beginning in 1563, it was demolished bit by bit, and in 1604, Henri IV had what was left replaced with factories to produce “silk and silver thread, as it is made in Milan” and, sometime before July 1605, a “great and magnificent” housing block for the workers.

The silk factory failed and was almost immediately pulled down, but Sully, Henri’s finance minister, stipulated that the large open square in front of it was to be retained and reserved for parades and festivals and surrounded by townhouses, perhaps incorporating the worker housing. As it was finally built, the Place des Vosges is not precisely square; it is a rectangle, 417 by 460 feet. There are thirty-six connected “identical houses” (pavilions) of limestone, brick, and blue slate roofs around the square, nine on each side. There were twenty-four *concessionnaires* who, like modern developers, constructed the pavilions and then rented them out to tenants. Most of the inhabitants were from the upper middle class and the lesser nobility. Neither the king nor the queen have ever lived there, even though the two slightly taller pavilions in the centers of the north and south sides of the square were named for them. The Queen’s Pavilion was, in fact, built for one of the king’s secretaries as part of a palatial residence that spread into the pavilions on either side.

The individual townhouses or pavilions are no more regular than the square, varying in width by as much as 4½ feet (from 47½ feet to 52 feet). Their interiors have always been quite diverse and have been repeatedly modified over the centuries. Some contractors substituted rubble stone for the prescribed brick construction, then covered it with plaster, which they

scored and painted to look like brick. Few visitors notice the fake brick, nor do many observe that details like windows and moldings vary from mansion to mansion, and similar details do not line up. *Dormers*, for example, vary considerably, as do wrought-iron railings, which are even occasionally replaced by stone balustrades. This relatively subtle variety adds much to the charm of the square.

The houses around the Place Royale were among the few in Paris, other than those of the upper nobility, that had open spaces in front of them. This feature made the place extremely attractive, immediately a fashionable address. The Place Royale also became a forum for discussion, a public theater, a place for festivals, and a popular place for duels and women of easy virtue. Finally, Cardinal Richelieu, who lived for a time at number 21, forbade the duels, commanding that the first who disobeyed would be decapitated. This tended to discourage the practice. Less was done about the prostitutes.

Precedents for the Place des Vosges and Its Influence on Later Architecture

Henri IV's squares were revolutionary for Paris, but they were not uncommon in Italy. The vertical organization of the facades, the brick-infilled stone frame, the steep roofs, and the multitude of chimneys was very French, however. As in the contemporary Place Dauphine, there was an arcaded ground floor with shops, two residential floors above them, and small dormer rooms for servants (which were also rented out, especially at the Place Dauphine) set into the steep roof. Each pavilion has four bays (vertical subdivisions) defined by narrow *pilasters* of alternating broad and narrow stones that combine with the horizontal stone *stringcourses* to create a grid. A window, also framed in stone, is set into the center of each rectangle defined by this grid. Red brick (or simulated brick) panels fill the spaces between the grid and the windows. The dormers, typically small and round-headed over the outer bays, larger with triangular (*pedimented*) tops over the two central windows, are arranged directly above the windows. Roofs are hipped; that is, they slope down between the pavilions to create valleys that are typically punctuated by chimneys. In addition to being higher than the others, the King's and Queen's Pavilions have only three bays, and the ground floor arcade is open to the streets beyond. The combination of limestone, brick, blue slate and floor-to-ceiling windows ("French windows") with wrought-iron railings was so visually striking that it was widely and immediately imitated, even in royal residences (the chateau at Blois and Louis XIII's hunting lodge at Versailles, for example).

Who Designed the Place Royale?

Claude de Chastillon, who built number 10 for himself, is sometimes given credit for designing all of the houses. Jacques II Androuet du Cerceau, the most famous French architect designing in the Renaissance style at the time, has also been suggested as architect, but neither man's name appears in doc-

uments, and it is not even certain that the same architect designed both the place and the facades around it. Because the Place Royale is so similar to a square in Charleville, France, its architect, Clément Métezeau, has also been proposed as the architect for the Paris square, but the Charleville square is much more refined; it may only have been imitated in Paris. Complicating matters of attribution are the details, especially the exaggerated quoins and keystones in the pediments and the dormers. They resemble those fashionable in sixteenth-century Italy, suggesting the possibility of an Italian consultant.

The Place des Vosges in Succeeding Centuries

By 1662, the quarter around the Place des Vosges was no longer fashionable; the upper class had gradually moved to the Faubourg St-Germain to be closer to the Louvre and the Tuileries palace. Nevertheless, the Place Royale remained a desirable place to live, and some owners bought one or two bays from neighbors to enlarge their residences. By 1684, the original thirty-seven pavilions housed only twenty-seven proprietors. In 1789, judges began to replace nobles as owners with the result that the state confiscated only nine of the pavilions as national property after the French Revolution. In 1790, the Place des Vosges was used for troop maneuvers, but otherwise, even though the Bastille fortress was very close and there were massacres all around, the Revolution affected the Place des Vosges very little. The equestrian statue of Louis XIII was melted down to be sure, but its loss was perhaps less than catastrophic since the horse and rider had been sculpted by two different artists and, according to most accounts, did not fit well together. The present equestrian statue is an 1818 replacement. Although not immediately obvious, a street runs across the square on the north side (where the silk factory was originally built) leaving openings at the corners. The northwest corner was filled in during the reign of Louis XIII by a pavilion similar to the others, but it was demolished in 1818 because it hindered circulation.

The Place des Vosges, as it is now called, is as prestigious an address today as when Madame de Sévigné was born in number 1 and when Victor Hugo rented the second floor of number 21, Richelieu's old mansion. Unlike those of the Place Dauphine, the facades of the Place des Vosges remain much as they were designed. A law of 1902 prescribed cleaning and painting every ten years. Especially on Sundays, artists, musicians, and promenaders return the Place des Vosges to its original character, and the arcades shelter cafes, boutiques, visitors, and inhabitants, just as they did when it was built.

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PLACE ROYALE. *See* Place des Vosges.

POMPIDOU CENTER, PARIS

Styles: Modern, “Hi-Tech”

Dates: 1971–1977

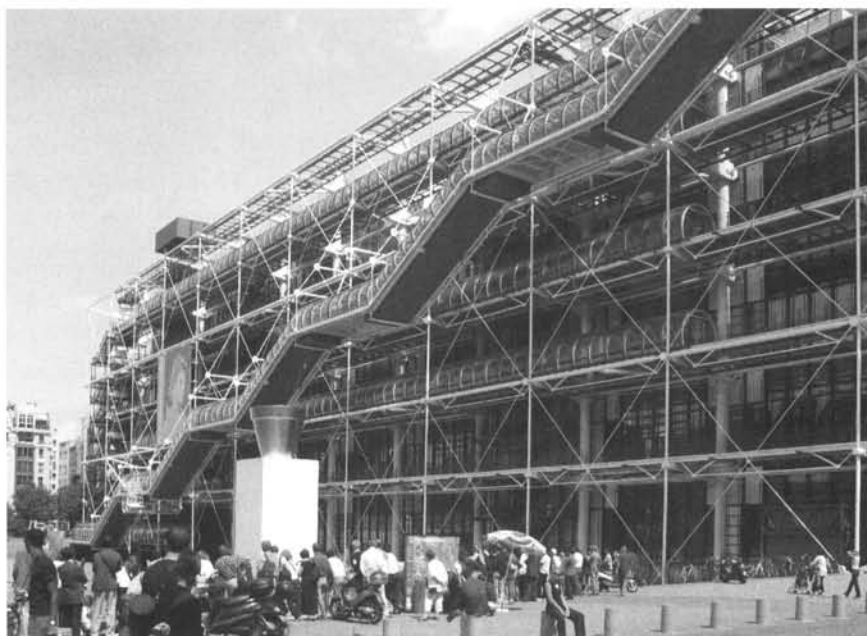
Architects: Renzo Piano (1937–) and Richard Rogers (1933–);
engineers: Ove Arup and Partners

The Pompidou Center (Centre National d’Art et de Culture Georges-Pompidou), originally called the Beaubourg Center after the area of Paris where it was built, is to twentieth-century Paris what the Eiffel Tower was for the nineteenth. It is the symbol of Modern Paris and the first major example of “Hi-tech” architecture to be constructed, in which advanced technology is stressed above all else. It remains the primary example of the type. The Pompidou Center is also representative of a period—the 1960s, 1970s, and 1980s—when it was considered desirable to combine cultural activities in a single megastructure (an extremely large building) or in a connected group of buildings such as New York’s Lincoln Center. A combination of modern art museum, exhibition hall, public library, experimental music studio and theater, and cinema, the Centre Pompidou also serves as a background for spontaneous and temporary cultural manifestations of every type that take place in the plaza in front of it.

The Genesis of the Idea

Georges Pompidou, General de Gaulle’s successor as president of France, proposed a multipurpose center in 1969 for a site in the center of Paris that had been cleared of dilapidated housing during the 1930s and turned into an immense parking lot for **Les Halles**, Paris’s central markets. The markets had been moved to the south of Paris, making the desolate site available for building. Even though the location was less than a half mile north of Notre Dame Cathedral and on the edge of the historic Marais District, Pompidou wanted a resolutely modern building on the site.

He proposed—and the president of France has almost dictatorial pow-



Contrasting dramatically with its surroundings, the Pompidou Center (1971–1977) houses both Paris' modern art museum and a large public library. One of the first "Hi-tech" buildings, the architects placed the mechanical systems (heating, cooling, and water pipes) as well as the elevators and escalators on the exterior, leaving the interiors free of constraints.

ers in such matters—an antimonumental facility for all the creative arts that would popularize them and make them accessible to the general public. The Paris Museum of Modern Art was to be relocated into the new building, and there were to be spaces for a cinema, avant-garde music, and theater, as well as much-needed temporary exposition space. Since, unlike most large Western cities, Paris had no large, free, general interest library open to the public, the new building was to include one. As a center for avant-garde art, it would need to be as flexible as possible to adapt to new conditions as they arose. There would also have to be parking for 20,000 cars and 1,500 buses.

The Competition, the Architects, and the Engineers

President Pompidou, a confirmed internationalist, proposed that architects be selected through a competition open to licensed architects from anywhere in the world. The competition drew 681 entries, of which 190 were from France. An international jury awarded the first prize to Renzo Piano and Richard Rogers, architects, and Ove Arup and partners, engineers, in 1971. Piano, an architect from Genoa, Italy, and Rogers, an En-

glish architect trained at the avant-garde Architectural Association in London and Yale University, had recently created a joint partnership while maintaining their own firms. Ove Arup, with 1,000 employees, was one of the largest engineering firms in the world and one of the most experimental, particularly the division of the firm called Structures 3. Nothing like their joint proposal had ever been built; it was immediately controversial.

Because both Piano and Rogers believed that change was permanent and inevitable, and that it was impossible to predict the future, they considered the requirement for flexibility to be the most important criterion for the building. They proposed a building with uninterrupted floor space, that is, with no internal columns or partitions, 160 by 560 feet (50 by 170 meters)—almost twice the size of a football field. Instead of interior columns, the floors would be held up by fourteen huge trusses supported on columns at the edges of the floors; that is, outside the building envelope. Like the structure, the other things that limit a building's layout and make remodeling a building difficult and expensive—stairs, elevators, heating and air conditioning ducts, electric cables, and water and sewage pipes—were moved *outside* the building, mostly in the rear, toward the busy rue Renard, in pipes and tubes painted bright colors. Most of the public would circulate through the building on escalators in glass tubes supported by a bright red trough that snakes up the front of the building from the ground level to the terrace on the very top floor. All external walls would be glass. The few solid partitions on the interior would support nothing but themselves and could be moved at will. In keeping with their hi-tech concept, their scheme had a multimedia facade with giant video screens that would give constantly updated information on Paris's cultural events and nonstop news. In 1971, this technology was impractical and too expensive. It was dropped in the final project, but one part of their proposal was not and has become an essential part of central Paris. Piano and Rogers, almost alone among the entrants in the competition, left about half the site open for a piazza. They realized that Paris needed a large, open public space to accommodate all the street performers that wander through the city.

Influences on the Design

Piano and Rogers's entry was similar in many respects to designs created by the futuristic "Archigram" group in London, a group connected with the Architectural Association, the school Rogers had attended. For example, one of those conceptual buildings was a giant structural frame into which smaller units could be "plugged" and "unplugged" as conditions changed. The Archigram group believed that a "living city" would change and evolve like an organism (they even proposed a "walking city"). Like many Archigram proposals, the Centre Pompidou's structural frame is the only permanent part of the building. Everything else can be modified.

Pompidou as Built

Piano and Rogers's competition entry was only an "idea." None of the difficult details had been worked out, and in the course of developing the project, many things changed. The client, too, made a number of additions, the most far-reaching of which was a large and complex center for experimental music (IRCAM), which was intended to lure the famous French composer and conductor Pierre Boulez back to France from the United States. In the original scheme, the ground level was largely left open to the air. Rogers admired the idea of a building on stilts that was pioneered by Le Corbusier, for example, in the **Villa Savoye** at Poissy. Because of additions to the program, however, the ground floor in the final building is completely enclosed and contains, among other functions, reception and information, a bookstore, temporary galleries, and a playroom for children. Another addition to the original program, an organization devoted to relations between the arts and industry (activities such as urban design, architecture, and industrial design) is located on a mezzanine level of the ground floor.

A public library of about 160,000 square feet occupies some space on the first three floors of the building, mostly on the second floor. The national museum of modern art occupies 170,000 square feet on the third and fourth floors. The fifth floor has temporary exposition galleries, a movie theater, a restaurant, and a terrace, which has a marvelous view over Paris.

The Structural System

All five of the above-ground floors were nearly identical large, open, column-free spaces as Piano and Rogers conceived for the competition. The enormous spans—more than 150 feet without intermediate support—made the structural system especially important and difficult to develop. Trusses and other structural members were so large that many of them, mostly fabricated in Germany, had to be delivered to the site in the middle of the night when there was little traffic. Huge steel projections (rocker arms) at the ends of the great trusses support exterior galleries. They were steel castings of unprecedented size for the building industry.

Criticism of the Centre Pompidou

The Centre Pompidou opened on January 31, 1977. It was a mixed success, immediately attracting crowds of up to a quarter million a day, but, it was objected that many of them just rode the escalators up to the terraces for the extraordinary ride and view of Paris. They went into neither the library nor the museum of modern art. About 8 million people still visit Pompidou every year, and the piazza in front is always filled with street performers, vendors, and pickpockets. As a tourist attraction, the Centre Pompidou is an unqualified success.

Many Parisians were shocked by the center's complete contrast with its

context. A common comment was that, with all the open structure and the mass of pipes and tubes, it looked like a factory set at the edge of the Marais District, the collection of aristocratic mansions from the late Middle Ages and Early Renaissance. Viewed from the towers of **Notre Dame** Cathedral, only a short walk away, the multicolored steel and glass Centre Pompidou stands out and above its monochrome, honey-colored neighborhood of five- and six-story limestone or stuccoed buildings in the same way a clown would stand out at a formal dinner party. Not everyone thinks this is such a bad idea.

Remodeling Pompidou

The expensively flexible spaces were also a mixed blessing. Many of the functions have not, in reality, changed very often or radically, but the architects spent nearly as much time designing “temporary” partitions to separate the diverse functions on each floor as on any other aspect of the building. Direct natural light is not desirable where books are stored or where paintings are exhibited, but the outer walls of the Pompidou were clear glass. In 1986, the Italian architect-designers Gae Aulenti (who also redesigned the Orsay Museum in Paris) and Italo Rota were brought in to completely remodel the museum of modern art and create a more permanent arrangement that shielded the paintings from the sun. It was impractical for readers to have to leave the library and use the external escalator when they went from one floor to another, so internal stairs were built in the library. Finally, “hi-tech” architecture has proved to have high maintenance costs; surfaces must be cleaned constantly to look bright and shining, but there was not adequate money to do that. Within a few years, the building looked old and not well kept up. In 1992–2000, the building was entirely renovated and parts replaced at a cost greater than the original budget for the building.

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PONT DU GARD, GARDON RIVER, NEAR NÎMES

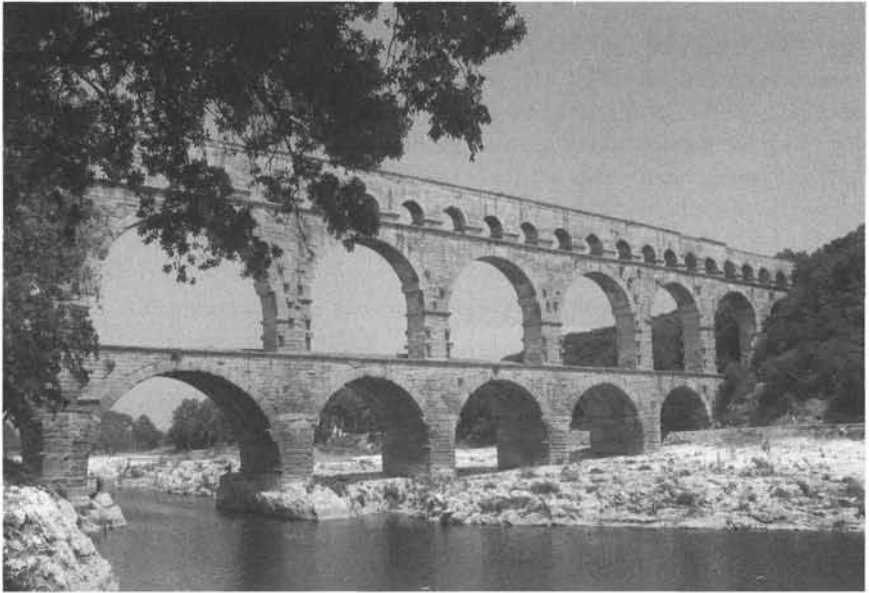
Style: Roman

Date: Completed in 18 B.C.E.

Architect: Unknown

The Pont du Gard, the bridge over the Gardon River, was not a bridge carrying traffic; it was the most visible part of an ancient Roman aqueduct that carried water from springs near what is now the town of Uzès into the city of Nemausus, modern Nîmes, which had a population of about 50,000 in Roman times. It would be a spectacular example of engineering in any period, but the Pont du Gard is particularly impressive because it was built 2,000 years ago, around 19 B.C.E. by Marcus Agrippa, a close friend of Augustus Caesar. Contrary to what many had previously believed, Roman engineers were remarkably knowledgeable about what we would term civil engineering. Modern engineers have determined that the engineers of the Pont du Gard knew as well as they do, how the geometry of a pipe or channel carrying water would affect the velocity of water flowing through it. The Romans knew just how massive to make a tall structure like the Pont du Gard so that it would not be overturned by the fierce wind in the valley of the Gard. Another problem was the river that rages through the narrow Gardon valley during flood season. It was just as capable of overturning the bridge by washing out its foundations as the wind was of blowing it over, so the lowest tier of arches of the Pont du Gard is massively built. It is not, however, more robust than it needs to be; computer analysis shows that it was even daring for its time. Neither too little nor too much stone was used. Built of stones without mortar, the masonry construction was remarkably efficient.

Beautiful in its pure, functional form, the Pont du Gard is huge—as tall as a modern fifteen-story skyscraper (160 feet or 48 meters) at its midpoint. Everything one sees is necessary, nothing is merely decorative. Its arches use the local stone in the most effective way, and even the stones that project from surfaces, which at first glance appear to be scattered almost randomly and ornamentally, were used to support the temporary wooden scaffolding, or centering, used during construction. Of the three levels or tiers of arches, the top, carrying the water channel, is lighter than the middle one, which sits on the heaviest and thickest bottom row of arches (the tier that resists the overturning motion of the water in the river). Although the top tier was designed to be physically lighter to reduce its overall weight and therefore the amount of structure needed to support it, the Roman engineers also made



Ancient Romans demanded clean, pure water for their cities. The Pont du Gard, completed in 18 B.C.E., is the most spectacular remnant of a Roman aqueduct that brought water to Nîmes.

it visually lighter, with three smaller arches arranged over each large one in the tiers below. The result is musical, with the triple rhythm of the top playing a delicate melody over the heavier bass rhythms below.

As an engineering feat, the invisible part of the aqueduct, which is underground, is just as fascinating as the Pont du Gard. Everywhere in the Empire, Romans went to great effort to supply their cities with pure water, even if the water source was a great distance from the city to be supplied. Since there could be no pumps, the water for the city of Nemausus had to flow, in pipes, by gravity at a relatively constant slope. This meant that a tunnel had to be dug through every hill between the reservoir (called a *castellum*) near the springs at Uzès and the city of Nîmes, or a bridge had to be constructed between them. Since both were expensive, as many hills as possible were to be avoided, turning the direct route of 12 miles into a circuitous one, 50 kilometers (30 miles) long, but with a relatively constant slope—except for the Gardon valley, which could not be completely avoided. The skill of the Romans as surveyors is apparent from the creation of this route, but the incredible accuracy of their techniques, impressive even by modern standards, is more obvious when one realizes that the reservoir at the city of Nîmes is only 55 feet (17 meters) lower than the reservoir at Uzès, meaning that the slope over the 30 miles was not even 2 feet in a mile! That is imperceptible to the naked eye, and undetectable by all but the most sophisticated surveying equipment.

Wherever possible, the Romans laid the water channel underground; they dug a ditch, poured a concrete base, and constructed walls of masonry. Over these was spread a nearly waterproof layer of concrete made from a mixture of lime, pork fat, and the milk of unripe figs! Then the channel was vaulted over with a masonry arch and the trench above it filled. In cross-section, this water channel was roughly a 4 feet (1.2 meters) square; the top, however, was arched to provide nearly 6 feet of headroom, high enough for a maintenance worker to walk upright inside. At the bridge section (the Pont du Gard), the channel was made higher and rectangular. Instead of the masonry arches, the channel was covered with more expensive but more durable, flat pieces of stone.

After the decline of the Roman civilization in the West, maintenance on the aqueduct went from inadequate to nonexistent. By the eighth century, the water conduit was entirely clogged, making the entire aqueduct useless. Wars and earthquakes damaged it further, and locals used stone from the water channel for other purposes and took away the lead that the Romans had used to waterproof joints. The Pont du Gard was kept because it was useful as a bridge. In the Middle Ages, the piers of the middle tier of arches were dangerously narrowed to make a wider passage for people, and in the 1740s, the lower tier was widened to provide a roadway for vehicles. Napoleon III ordered thorough repairs in 1855.

Obviously, a fabulously expensive construction and expensive to maintain, the aqueduct for Nîmes was nevertheless scarcely unique in the Roman world. A copious supply of good water was important to the Romans, and every major and most minor Roman cities had aqueducts to supply houses, fountains, and especially public baths. These establishments were important for the Romans' social life, even in the provinces; they were centers of learning and entertainment, as much as places to keep clean. Because of their baths, the ancient Romans used more water per person than inhabitants of New York City do today. Of the other Roman aqueducts that survive, some of the bridge sections may be bigger than the Pont du Gard and some (Segovia, Spain) still carry water into the cities for which they were built. None, however, is more impressive in its site, more accomplished in its construction, or more beautiful in its proportions and details than the Pont du Gard.

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REIMS CATHEDRAL (NOTRE DAME), REIMS

Style: High Gothic

Dates: 1211–1311

Architects: Jean d'Orbais, Jean le Loup, Gaucher de Reims, Bernard de Soissons, and Robert de Coucy

The Coronation Church of France

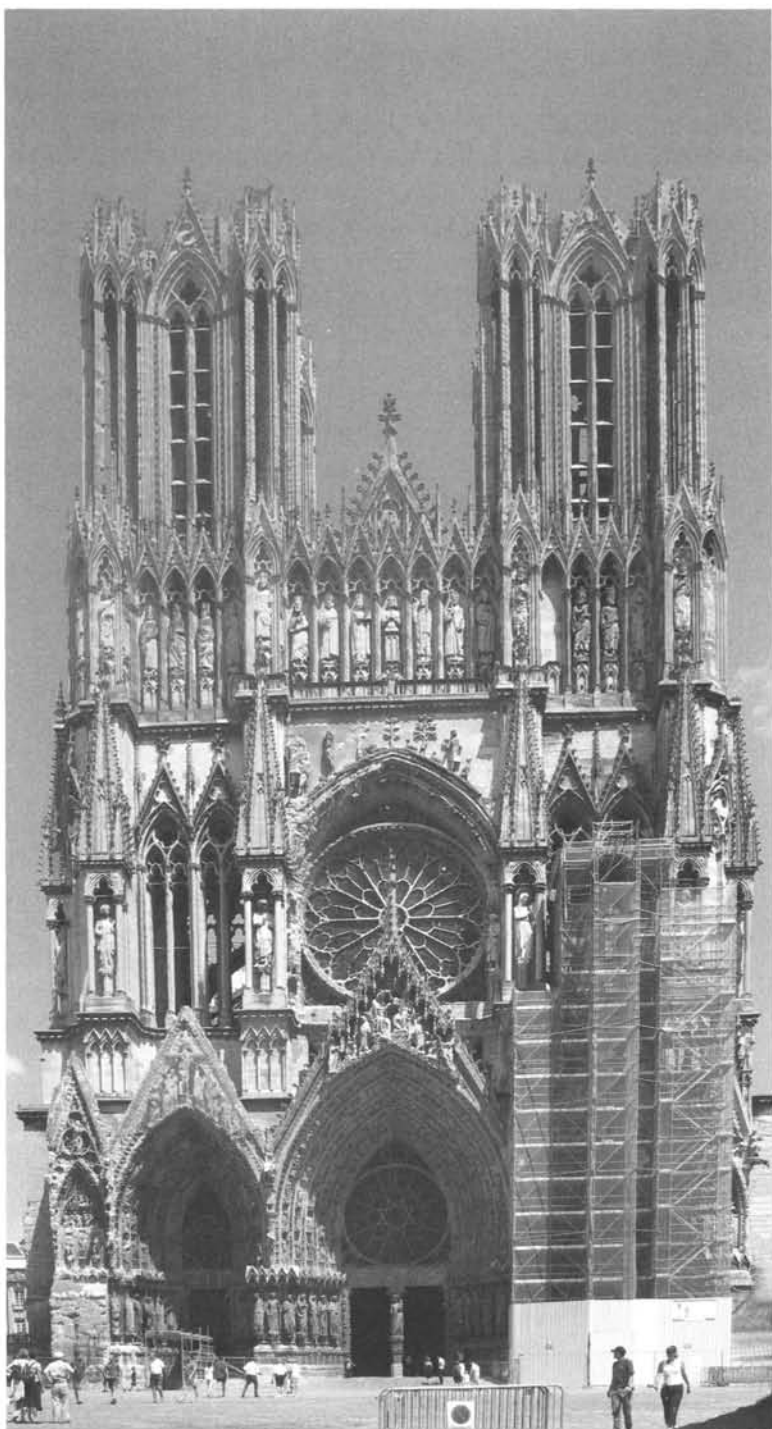
According to tradition, in 496 c.e., a dove delivered oil to Remi, a holy man, for anointing Clovis, King of the Franks. From that time, all French kings were crowned in Reims (also spelled Rheims), in the cathedral. A fire in 1210 destroyed the *Carolingian* church, but since it was the coronation church, it was very quickly rebuilt on the same site. The new church is one of the grandest and most splendid of all the Gothic cathedrals.

The Architects of Reims Cathedral

The architects' names were inscribed in a labyrinth design in the center of the *nave* floor. Its prominence suggests that Gothic architects, far from anonymous as is commonly believed, were proud and maybe a little vain. At the very least, they were famous and respected, since they would have needed the clergy's permission for the inscription. Unfortunately, a later church official, irritated by the children and others who followed the path in the design, destroyed it in 1778, and had it replaced by plain paving. Fortunately, a drawing preserves the inscription. Jean d'Orbais "began the chancel [the part that contained the high altar] of the church" and is generally given credit for the design of the whole church. Though they modified details, his successors followed d'Orbais' design. Jean le Loup took over in 1231. Gaucher de Reims worked on the great entry doors or portals from 1247 to 1255, but he may have been more of a sculptor than architect. He was followed in 1255 by Bernard de Soissons, who is shown in an engraving in the cathedral tracing a circle with his compass with an inscription saying he "made five vaults [of the nave] and worked on the rose window." Robert de Coucy worked on the west front from 1290 to 1311.

Chronology of Construction

In the first nine years, the choir was largely completed and work was begun on the nave, but civil unrest interrupted it between 1233 and 1236. The clergy took possession of the choir in 1241. Six towers and seven bel-



Most French kings were crowned in Reims Cathedral (1211–1311) and buried from the basilica of St. Denis.

fries were originally planned, but only two were built. Their spires and the flèche, the spire over the crossing, were destroyed in a disastrous fire in 1481. Spires of the facade towers were never rebuilt, and the other four projected towers were never even begun.

The Golden Age of Gothic Architecture

France's "Golden Age" of Gothic architecture was the thirteenth and fourteenth centuries. Newly wealthy cities in northern France competed to build the biggest, longest, tallest, and most splendid church, much as cities today compete for the tallest skyscraper. Reims, the capital of the Champagne region, and Amiens, the capital of Picardy, were particular rivals. Beauvais, a third, much smaller city, built a taller choir and *transepts* than either, the tallest ever, but the nave was never added, so Beauvais remains a spectacular fragment out of competition. All three cities were centers of weaving, with Reims known especially for its woolen cloth; now, it is better known for champagne.

The "Martyred Cathedral"

Reims had been an important and wealthy Roman city called Durocortorum. With about 80,000 inhabitants, it was much larger than Paris. Reduced to little more than a village after the fall of the Western Roman Empire, it revived during the Middle Ages. Its strategic location at a commercial crossroads made it a frequent military target, but the worst destruction was during the First World War, when the German army bombed the cathedral. They had concluded that destroying one of France's most important symbols, which had survived the French Revolution intact, would help to demoralize the country. Eighty percent of the city was demolished, but Reims Cathedral, like Beauvais's, which was also bombed at the beginning of the Second World War, was so well built that much of it survived, even though the vaults of the nave were reduced to a pile of rubble. Henri Deneux began restoration of the church in 1921, but work proceeded slowly, and the cathedral could not be used again until 1937. Restoration continues today. Among other affectionate names, Reims Cathedral is called the *cathédrale martyre*, the "martyred cathedral."

The Facade of Reims Cathedral

Reims's architects used the H-shaped west facade of Paris's Cathedral, **Notre Dame**, as their model, but they made significant changes. Paris's facade is serene, with a classical balance of vertical and horizontal; the surface is stressed, making important features like the main doorways appear to be carved into the mass of the facade. Reims's facade is dynamic and soars. Vertical lines are emphasized; the facade is composed of layers and is much more heavily ornamented. The portals are within porches set in front of the facade. They have sharply pointed triangular gables that overlap the bases of the towers and align with the vertical "windows" so that one's eye goes up

rather than across the facade. Similarly, the Gallery of Kings, a horizontal row of huge sculptures, is a single horizontal plane just above the portals at Paris. At Reims, the gallery weaves over the tower buttresses at their base without interrupting the insistent verticality of the buttresses, the towers, and the tracery in the towers. Both its verticality and the superabundance of decoration make Reims's west facade immediately recognizable.

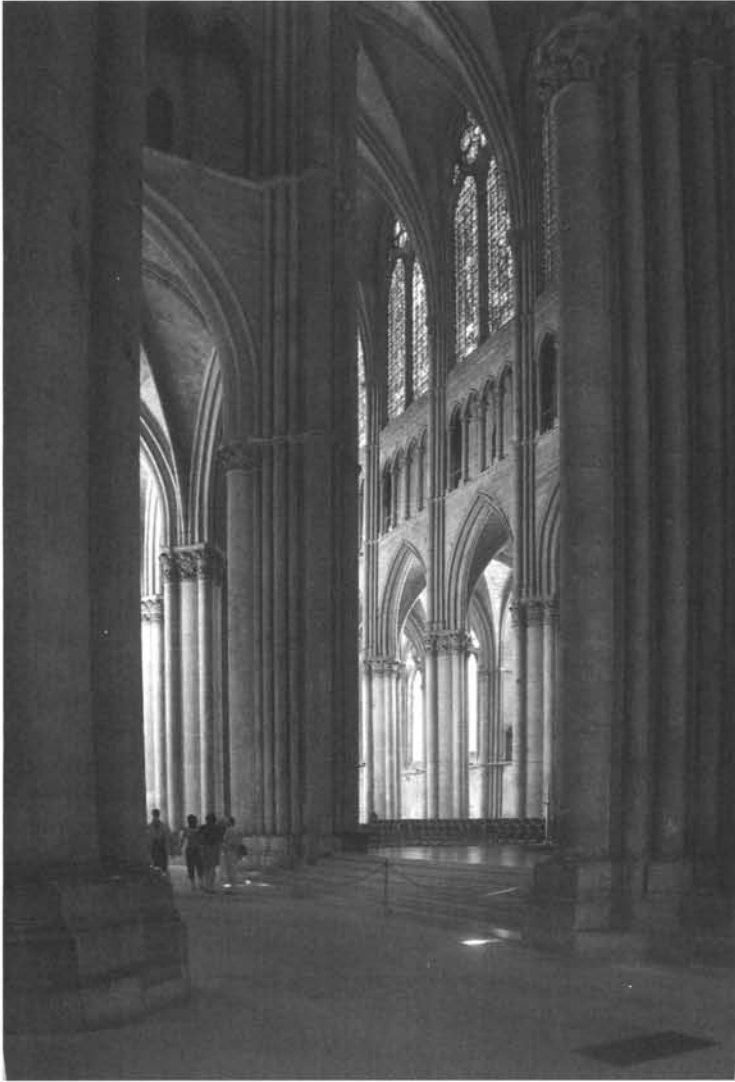
The Facade Sculpture

Many of the fifty-six colossal statues in the Gallery of Kings, each 14 feet tall and weighing 6 to 7 tons, are replicas, installed from 1927 to 1970, to replace those destroyed in the World War I bombing. Some of the sculpture on the upper part of the facade, badly decomposed by exposure to the weather, are also replacements. The sculpture near the doors, however, less exposed to the weather and protected by sandbags during the war, is mostly original. It represents increased freedom from its architectural setting. On Late Romanesque and Early Gothic churches, for example, the Royal Portal of **Chartres Cathedral**, proportions and forms of statues make them part of the building. Figures at Reims (and on Chartres's transept facades) have more natural proportions and are more independent from the building, which becomes a backdrop for them. Some are composed in conversational groups of two or three. Many are masterpieces, comparable in quality to the sculpture on the Parthenon. Reims's sculpture was widely copied, not only in France but also in Germany, Italy, and Spain.

It is possible, as some speculate, that Reims's artists had seen Greek sculpture while on the Fourth Crusade, but more likely they based theirs on sculpture from the Roman city of Durocortorum, much more of which was probably extant then than is preserved today. The Elizabeth of the Visitation, for example, looks like a Roman matron and the Virgin like an Aphrodite. Among the figures, many—the exceptionally beautiful “Smiling Virgin” on the center post (*trumeau*) of the central doorway is an excellent example—have a characteristic “smile.” The “smiling angels” in shrines atop the buttresses on the left side of the cathedral have given Reims another nickname: “the cathedral of angels.”

The Interior: Clarity, Height, and Light

Reims's nave is large, dramatic, unified, and harmonious. At 453 feet, it is only 22 feet shorter than Amiens, the longest of the Gothic churches. The nave is 125 feet high (about as high as a ten-story building), the tallest up to that time. The push to build ever higher and more daring naves is obvious from the following list, in chronological order, of nave heights: Laon, 79, feet; Notre Dame, Paris, 110 feet; Chartres, 114 feet; Bourges, 122 feet; Reims, 125 feet; Amiens, 139 feet; and Beauvais, 157 feet 6 inches. Beauvais' vaults collapsed in 1284, effectively marking, and perhaps in part causing, the end to the competition.



The nave of Reims Cathedral from the crossing.

Reims's plan and its nave are typical of High Gothic churches. Chartres Cathedral was the model, although Reims is larger in all respects. As at Chartres, Reims's interior gets much wider at the transepts and maintains that width into the choir. (Paris and Amiens, by contrast, are the same great width from end to end.) Because the ground-floor arcade is higher, the windows larger, and the nave proportionally narrower than at Chartres, the interior of Reims seems much lighter, less earthbound. Chapels radiate from the ambulatory around the apse, as is typical of the period, but, exception-

ally, no chapels were ever built between the buttresses along the side of the nave. Consequently, Reims's side elevations are exceptionally "pure" for a Gothic church.

The Stained Glass Windows at Reims

Some stained-glass windows in the nave were replaced with grayish glass when the church was "modernized" in the eighteenth century, and some were badly damaged in World War I, but many remain. They are among the finest in France. Exceptional at Reims is how much of the wall was replaced by stained glass. When seen from the interior, the west facade is a glowing, multicolored wall unique in Gothic architecture. When it crosses the west facade, the solid back wall of the *triforium gallery* (the arcaded passageway above the ground-floor nave arcade) is replaced by a horizontal strip of stained-glass windows. All of the wall up to the great arch of the facade—the huge western rose window and the triangular areas around it—is also filled with stained glass, as is the huge *tympanum* (the triangular area) above the main entry door. In the nave, there is no solid wall between the *clerestory* windows (those highest) and the columns to either side or between them and the vaulting. It was possible to fill this entire space above the triforium gallery with stained glass because Reims's architects used a new type of tracery (the stone pieces that hold the glass in place). Instead of plate tracery, so-called because it looks as if the window openings were punched out of a plate of stone, the architects used bars of stone (bar tracery) that are independent of the structure. Since they are like a skeleton that supports nothing but itself and the glass, they can be shaped with great freedom and permit a much greater ratio of glass to stone than is possible with plate tracery. In the chapel at the east end of the church, on axis with the entry, are three modern stained-glass windows, wonderfully integrated with the older windows. Installed in 1974, they were designed by the Russian Jewish immigrant Marc Chagall and are among the most successful modern windows in any Gothic church. (Chagall also painted the new ceiling in the auditorium of the **Paris Opera**, a less-happy addition to that building.)

Because Reims's architects were more consistent—they used the same window design for the aisle and clerestory windows throughout the church—and they carefully aligned details like the shrines atop the external buttresses, the exterior is more regular and more of an organic whole than the exterior of most Gothic churches. Its exterior is also more closely integrated with the interior. For example, the tops of the pinnacles over the shrines correspond to the bottom of the clerestory windows, and the plinths on which the shrines sit are the same height as the triforium gallery.

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<http://www.learn.columbia.edu/gothicsculpt/PAGES/page01.html>. Good pictures, especially of the sculpture.

RONCHAMP (NOTRE-DAME-DU-HAUT), NEAR BELFORT, HAUT-SAÔNE REGION

Style: Modern

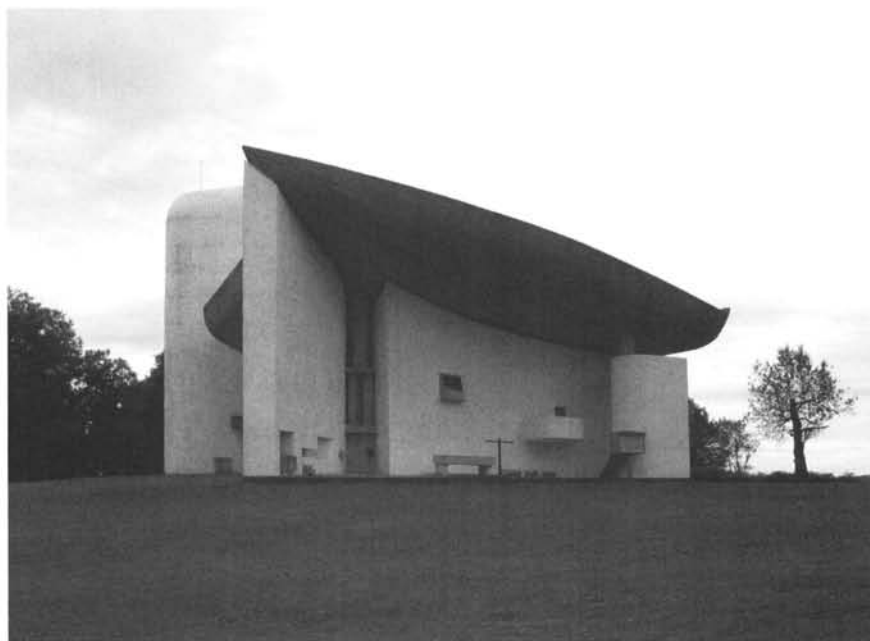
Dates: 1950–1955

Architect: Le Corbusier (1887–1965)

Notre-Dame-du-Haut is one of the most famous—many would say *the* most famous—churches of the twentieth century. Almost everyone refers to the chapel that crowns Boulémont hill as Ronchamp, the name of the little village at the bottom. Ronchamp looks like no previous church, and when it was first built, it shocked or mystified almost everyone: local villagers, church traditionalists, and even admirers of Le Corbusier, its architect, the most influential European architect of the twentieth century. Once the strangeness had worn off, however, Ronchamp was increasingly loved by almost everyone, even those who normally do not like Modern architecture, much less the architecture of Le Corbusier.

A Curious Choice of Architect

Boulémont hill was a strategic site overlooking an invasion route from the east near the Swiss border, so structures on it were repeatedly destroyed. There had been a pagan temple there in the third century B.C.E. followed by Christian churches that, since the fourteenth century, had been the site of pilgrimages. Germans had destroyed one of these, a Neo-Gothic chapel, with artillery fire in 1944. It had replaced a chapel struck by lightning in 1913. There was not enough money to reconstruct the Neo-Gothic church; instead, the *Commission d'Art Sacré* (Commission for Sacred Art) for the Roman Catholic Church proposed Le Corbusier as the architect for a contemporary building. He would seem a curious choice. Raised in Switzerland as a Calvinist Protestant, he not only had lost his faith, he had mentioned from time to time how Roman Catholic crusaders had considered some of his ancestors



A late masterpiece by Le Corbusier, Notre-Dame-du-Haut (1950–1955), better known by the name of the nearby village Ronchamp, at first shocked both traditionalists and his admirers because of its unprecedented forms. It is now generally admired.

heretics during the Albigensian Crusade and killed them. He said, however, that he did not carry a grudge.

Father Pierre Alain Couturier (1898–1954), a leader of the movement to revive the Roman Catholic Church in France with contemporary art and architecture, had chosen Le Corbusier and had convinced Canon Ledeur, secretary of the regional Commission of Sacred Art, to select him. Father Couturier had been an artist before becoming a Dominican monk. As editor of the magazine *L'Art Sacré*, he had successfully supported modern artists, regardless of their religious or ethnic background, for various commissions in Catholic churches. Most prominently perhaps, Marc Chagall, a Russian Jewish immigrant, had designed superb stained-glass windows in **Reims Cathedral**.

At first, Le Corbusier refused the commission, but he reconsidered after a visit to the site on June 4, 1950, and after Father Couturier and others assured him that he would have free rein in the design. Inspired by the views from the hilltop to “the four horizons,” by the next day, Le Corbusier had sketched out the basic idea for the chapel: a huge abstract sculpture, meant to be walked around as well as into. Ronchamp’s exterior is unusually important, since masses are held outside for the crowds of up to 10,000 pilgrims that come to the chapel several times a year. Le Corbusier consequently de-

signed the church as an appropriate backdrop for these services, with three towers, a sweeping roof, a south wall pierced by many windows, and an east wall with outdoor altar and pulpit. He added in notes on his first sketches that he wanted to use stones from the ruins of the old church in the walls of the new one. His project was approved in 1951, and construction began in 1953. Unfortunately, Father Couturier did not live to see the chapel's inauguration on June 25, 1955.

An Evocative Exterior

Notre-Dame-du-Haut (Our Lady of the Heights) is a free-form building; that is, its shapes cannot be described using conventional geometrical terms or mathematical formulas. Visitors find multiple meanings for its forms. To some, the sharp “prow” of the southeast corner conjures images of a ship; others are reminded of praying hands. An apparently random pattern of rectangular openings with slanting sides punctures the curving, sloping south wall and suggests to yet other visitors a World War II bunker. The earth-colored concrete roof that dramatically overhangs the wall and curves upward has been variously seen as a nun's headdress or a monk's cowl.

Like the south wall, the east facade (the backdrop for the pilgrimage masses) is curved and shaded by the great roof. An outside altar and a pulpit stand in front of the wall. Above them, in a window, the 300-year-old statue of the Virgin Mary that is venerated by pilgrims is displayed. Le Corbusier shaped the wall and roof to create an effective acoustical shell that reinforces voices in the religious services to the crowds that assemble on a grass amphitheater in front of a stepped pyramid made of rubble from the old church and dedicated to the war dead. The west facade is blank, interrupted only by a bulge representing the confessional within the church and by a *gargoyle* (rain spout) that, looking like the end of a double-barreled shotgun, thrusts over the edge of the roof parapet and hangs to spill rainwater into a collection basin. Le Corbusier did use rubble stones and brick from the ruined church in the walls of the new church, but the roof is actually held up by a series of reinforced concrete piers embedded in the walls. These composite walls were sprayed with concrete and whitewashed with lime. They glow white, making the church a beacon both during the day and in moonlight.

A Sacred Interior

Although thoroughly unconventional, Ronchamp's interior, which serves as a place of prayer and meditation for visitors between pilgrimages, strikes almost all who enter the chapel as a profoundly religious space. Ceremonial entry is through a large, square, 2-ton steel door at the bottom of a broad slot created between the south wall and the tallest of the chapel's three towers. Le Corbusier, a painter as well as an architect, covered the door with brightly colored symbols. Daily entrance is through a smaller, more conventional door that he placed between the other two towers, which are

rounded both in plan and at their tops, on the opposite (north) side of the chapel from the ceremonial entrance.

Ronchamp's interior, like its exterior, is richly evocative: it is both modern and primordial, man-made and organic. But it is undeniably a place to pray, a sacred space. It is softly and indirectly lit. To demonstrate that the reinforced concrete frame embedded in the walls supports the roof, not the walls themselves, Le Corbusier stopped the south and east walls short of the roof. The tops of the concrete frame are visible in the resulting gap, which he filled with a narrow strip of glass. Light coming in through this continuous strip diffuses across the bottom of the roof, which sags over the center of the space then rises toward the altar. Light is also brought down through openings in the tops of the towers, which rise above the roof like periscopes, to create a glowing background for the altars at their bases. Above and to the right of the main altar is the window containing the statue of the Virgin, which may be turned to the interior for daily mass. Most of the interior is devoid of seating; there is only a small group of pews in front of the altar. The only windows in the walls of the church are in the south wall, to the right of the pews. Each of the deep-set, small openings is filled with either a pane of clear glass on which Le Corbusier painted a symbol or with a pane of stained glass.

Criticism

Initial reaction to Ronchamp was less than positive. Local villagers at first refused to supply water and electricity. To many critics, one of the most famous Modern architects seemed to have repudiated his earlier work, which had been characteristically geometric and inspired by machinery (for example, his iconic **Villa Savoye** at Poissy). Ronchamp was irrational, unmathematical, and organic. Le Corbusier had, however, been moving away from sleek mechanical forms since before the Second World War, and the forms he used at Ronchamp had appeared in his paintings in the late 1930s and early 1940s, particularly those related to sculptures.

He said that he derived the shape of the roof from a crab's shell he picked up on a Long Island beach while visiting his friend, the sculptor Tino Nivola during his one trip to the United States (when he provided the original designs for the United Nations Buildings in New York). A naturally strong form, the shell's shape also provided the sense of enclosure he was seeking. In addition, it was ideal for collecting water, a requirement of the program. (There was no water on the site, a factor that had hindered various attempts to put out fires in previous churches.) While staying with the Nivolas, he had also experimented with sand sculptures, using a technique Nivola had developed, that suggested some of the forms and textures of Ronchamp. Le Corbusier based the towers on sketches that he had made on a 1911 student trip at the ruins of the emperor Hadrian's first-century c.e. villa outside Rome.

Ronchamp is, in fact, a mystical, personal, intuitive building expressing the feelings Le Corbusier admits sensing on his first visit to the site: some-

thing about it that had attracted worshipers since antiquity. Le Corbusier, who was not conventionally religious, had tried to capture that essence, which he felt was sacred rather religious. He wanted his chapel to be a place of prayer and silence, of peace, of reflection, of honor to his mother and aunt. He was successful. Ronchamp steadily won the admiration of the local villagers and critics; it is admired by Catholics, Protestants, and nonbelievers alike.

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ROYAL SALTWORKS, ARC-ET-SENANS

Style: Revolutionary Classicism

Dates: 1775–1779

Architect: Claude-Nicolas Ledoux (1736–1806)

A Practical Dreamer

The Royal Saltworks at Arc-et-Senans in eastern France is one of the best examples of French Enlightenment architecture, typically full of contradictions. A factory town for about 250 persons, it represented a preoccupation with both science and the visionary and ideal. Claude-Nicolas Ledoux, the architect, turned back to an austere form of classicism to create revolutionary buildings that predict much late twentieth-century architecture. His utopian plan for a small, largely self-sufficient company town, an early example of the type, was based on Jean-Jacques Rousseau's Romantic philosophies. It was, at the same time, an efficient factory town, though Ledoux's grandiose architecture made it unprofitable. Even more unrealistic was the utopian city, with which it is often confused, that Ledoux designed in parallel with the Saltworks. Most of the buildings he proposed for this Ideal City of Chaux (named for the nearby forest) were wildly impractical, causing



Claude-Nicolas Ledoux conceived the Royal Saltworks at Arc-et-Senans (1775–1779) as a utopian worker's village. Still impressive in its originality, it is now an international center for urban studies.

Ledoux frequently to be dismissed as at best a utopian dreamer, if not mad. In fact, he was an accomplished technician who designed and improved every aspect of the industrial machinery and processes for the real Royal Saltworks.

The Origins of the Commission

Before refrigeration, salt was of extreme importance in preserving food. Its production, distribution, sale, and taxation were a major source of income for many governments. Protests, armed revolts, and smuggling of salt were common, thus facilities for its production and distribution had to be exceptionally secure. Under King Louis XIV, the “General Farm,” an organization responsible for collecting taxes, oversaw production of salt in the Franch-Comté (eastern France). By the seventeenth century, the forests near the city of Salins, a center of salt production, had been severely depleted, and since wood was the most practical source of energy for evaporating the brine of Salins's salt springs, the Farm decided to move the production facilities to a site between the hamlets of Arc and Senans, near the royal forest of Chaux. As Ledoux remarked, it was easier and cheaper to transport brine than to move a forest in pieces.

In 1773, King Louis XV chose Ledoux to design the new factory. He was thirty-seven years old, and was well known for his aristocratic mansions. His having designed a garden pavilion for the king's mistress, Madame du Barry, which the king admired, was a special recommendation. Ledoux had also built bridges for the Water and Forests service, the technical supervisors for the factory.

The Royal Saltworks: Architecture and Urban Town Design

Ledoux was inspired by Diderot's *Encyclopédie* to use the latest technology to make the new factories as efficient as possible. He was aware of the importance of security, of protecting the facilities from fire, and as an admirer of Rousseau, he also wanted to make the factory morally uplifting, to give the impression that work was a noble endeavor.

In October 1774, after having his first project rejected, Ledoux presented one that met his ideals and was accepted by the king. It was a semi-circle with a 335-foot radius (about one American city block). The factories were placed on the diameter; communal houses for workers *and* their families—a novel concept for the time—as well as support facilities (storehouses, a bakery, carpentry shops, offices, etc.) were arranged on the circumference. Outside each block of the workers' housing were vegetable gardens so the workers could grow their own food. A moat and an outer wall encircled the community for security. Between the two factory buildings, Ledoux put the "Director's House," a misnomer, since the director's office and apartment were only a small part of this central and most splendid building, which also contained other administration offices, guest apartments, a courtroom, storage facilities, and the community's chapel. The director was to be "first among equals."

Entry to the community was through the center of the "Propylaea," directly across from the Director's House on the outer ring. On either side of the entry, behind blank walls, were guard posts, apartments for the concierge, a jail (with two cells), a bakery, reservoirs for water, and a laundry. The director and officials of the General Farm had a private entry behind the Director's House, but everyone else and every thing that entered and left were checked by guards at the Propylaea. The quantity of salt leaving was reconciled with records kept by officials housed in separate buildings at the ends of the diameter. Ledoux's semicircular plan, with a control point at the center was ideal for surveillance, a "panopticon" plan still used in libraries, hospitals, and prisons. In principle, the semicircular shape also minimized walking distances, though in so small a facility, this was scarcely a critical issue.

Typically, Ledoux described his design in grander terms: "the form of the saltworks should be as pure as that which the sun describes in its course." It was also a symbolically pleasing form, since to Ledoux, it recalled a Roman theater like that at **Orange**) and probably, given Ledoux's deep involvement in Freemasonry, it had Masonic connotations.

The Construction of Arc-et-Senans: The Significance of Specific Buildings

Construction at Arc-et-Senans began in 1775 and was stopped in 1779. Ledoux first constructed a 13-mile-long aqueduct, a pipeline made from the

trunks of 15,000 pine trees hollowed out and fitted end to end, to bring the brine from the springs at Salines. It was underground most of the way, both to protect against freezing and to discourage theft. Control stations, only one of which survives, along the pipeline housed guards. At Arc-et-Senans, Ledoux constructed a huge wooden shed, 1,600 feet long (nearly a third of a mile) and 35 feet wide, to concentrate the brine and remove dirt. After passing three times through the shed, the brine was stored in a 75,000-gallon reservoir, 16 feet deep. Nothing is left of the shed and only traces of the reservoir remain. These were strictly utilitarian buildings, but the other buildings were at least as important symbolically as functionally.

The Propylaea was a portico with *Doric columns* modeled after the entry to the Acropolis in Athens. Ledoux meant it to suggest the nobility of work. On the blank, curved, one-story walls to the left and right, Ledoux added sculptures of brine that congeals as it pours out of urns. These are forerunners of industrial “logos” such as the seashell of Shell Oil Company. Ledoux’s logos appear throughout the community. Behind the Doric columns is an artificial grotto symbolizing the underground source of the salt water. Ledoux, who considered himself a classical scholar, may also have been making allusions to Plato’s cave, and the path through the portico and grotto and across the inner courtyard to the chapel in the Director’s Building may also, like Tamino’s voyage in Mozart’s opera *The Magic Flute*, refer to Masonic ritual.

Ledoux’s first version of the Director’s House and chapel would have used one quarter of the total budget, and was rejected as being far too grand and large. Only one of four proposed columned porches was retained, and Ledoux had to fight to keep it, arguing that it would protect those waiting to go to the chapel in the house from rain and snow. Ledoux appropriated the “rustic” Doric Order of Palladio (shafts made of alternately rectangular and round blocks) to give a strong, “primitive” image. A circular window (oculus) in the *pediment* above the columns symbolized the all-seeing eye of the direction (and possibly also the Masonic eye familiar from the dollar bill).

The chapel from Ledoux’s first scheme for the Director’s House reveals that, like so many Enlightenment intellectuals, Ledoux was a Deist; that is, someone who believes in a Supreme Being, but not in His interference in everyday lives. The chapel is, consequently, the symbol of God rather than a place to worship. It is neither more nor less than a grand staircase in the central, three-story space of the building that leads up to a niche lit from a hidden source—the Divine Light at the end of the journey.

Ledoux kept the four-level arrangement of the original project: a meeting room, administration offices, courtroom, bank, and the director’s apartment on the ground floor; the chapel surrounded by apartments for the Farmer General on the main floor; servant’s quarters on the top floor; and, store-rooms for wood, wine, and food for residents of the building in the basement. Having complained about how animals were neglected in France, Ledoux designed stables behind the Director’s House; they are as monumental as the house.

The two factory buildings on either side of the Director's House, 90 feet wide and 265 feet long, resemble Giulio Romano's Palazzo del Tè in Mantua. Giving factories the appearance of a famous palace was another of Ledoux's statements about the nobility of work, that factories should be physically as well as aesthetically agreeable. Unlike other factories of the period, Ledoux's were well ventilated: Smoke from the evaporation pans was carried to chimneys at the back of the buildings. Separate openings disguised as dormer windows evacuated the chemical fumes of the evaporation process.

Each of the four buildings devoted to workers' housing had twelve rooms of four beds arranged on either side of a two-story, central common space with a fireplace and cooking facilities. Ledoux believed that this sort of communal life would create a healthy society that would take care of the needs of its members. In reality, the fire in the central space was inadequate and smoked too much, and a fireplace had to be built for each pair of rooms. A large attic space, reached by stairs in the common room, could be used for storage, including storing the crops grown in the individual garden plots that Ledoux felt would make the workers almost self-sufficient and keep them "from temptation." Families living in his housing would be virtuous because "the worker would be surrounded by sweet illusions and he would be with his wife and children during hours of relaxation." By modern standards, the workers were overworked and underpaid, but Ledoux gave them far more consideration than was usual at the time. The turnover of the workers at the saltworks was very low, so perhaps the arrangement was relatively effective. Comfort was sometimes sacrificed to "architecture." Two of the rooms in each building got light and air only through a small round window in the center of the logo urns.

After the French Revolution

Declared property of the state after the French Revolution, the saltworks passed from hand to hand. Attempts to modernize the factories by substituting oil for wood could not reverse a decline in production. By 1895, it was no longer profitable and the society of the owners permanently shut it down. Some of the buildings served as warehouses, and a few were used for housing, but most were abandoned and fell into ruin. The Director's House was struck by lightning in 1918 and burned. It was then abandoned, and in 1926, the owners dynamited it to avoid having to restore it when the saltworks were classed a national monument. From 1932 to 1996, buildings were gradually restored, but during that time, the saltworks were occupied by the Nazi army, became a camp for Spanish refugees, were an internment camp, and an archival depot. Today, the Royal Saltworks are the Institut Claude-Nicolas Ledoux, an international cultural center for urban studies. They were classed a World Heritage Site by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 1982.

Little remains of the original interior of the Director's House, which has been remodeled into offices, an exposition hall for the "pursuit of the ideal

city,” and, in the basement, a museum of salt production in the region. The Propylaea is now the reception and library for the foundation that occupies the Royal Saltworks.

All of the factory equipment has been lost, and the factory interiors have been reconstructed with reinforced concrete. Their walls, weakened by the corrosive effect of the salt vapor, had to be strengthened by a new concrete structure that supports both them and the roof. The eastern factory has also had an intermediate floor inserted. Originally remodeled as a stud farm, the factories are now multipurpose rooms for exhibitions and concerts. The two small buildings at the east and west ends of the diameter of Arc-et-Senans are probably the best preserved of all the structures at the saltworks, since they have been almost continuously inhabited.

The Ideal City of Chaux

Ledoux was imprisoned during the French Revolution and nearly guillotined as a result of his designs for the king and the General Farm, especially for the very unpopular (and costly) tax gates he designed for the walls around Paris. His last years were spent developing his “Ideal City of Chaux” and publishing engravings of his designs for it and his earlier buildings. He projected a series of five volumes entitled, in the best Enlightenment fashion, *L'Architecture considéré sous le rapport de l'art, des moeurs, et de la législation* (Architecture considered in relation to art, morals, and law). Only the first volume was published, shortly before his death in 1806. Developed along with the real city, the Utopian version of the saltworks was based on doubling the semicircle of Arc-et-Senans into a full circle, still with the factories on the diameter, to increase population. Outside this circle was an imaginative series of buildings—some private (houses for artists and special craftsmen, for example), some public (a church, a brothel, temples to the remembrance of women, a temple to all virtues, etc.). Some of these could have been constructed, but most were fantastic, causing many contemporaries to consider him mad. For example, he designed a building shaped like a section of a huge pipe to house the surveyors of the nearby Loue River. The cemetery for Chaux was one of his most abstract and potent designs. Underground catacombs are arranged in concentric circles around an enormous empty sphere half buried in the ground. Although visitors could look into the sphere from radial galleries that connected the catacombs, it would have been inaccessible, a powerful “image of nothingness,” as Ledoux put it. His intention was to produce a “sublime” effect, sublimity being even more important than beauty for many Western architects and theorists at the end of the eighteenth century.

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SACRÉ CŒUR (BASILICA OF THE SACRED HEART OF CHRIST), PARIS

Style: Eclectic (Romanesque-Byzantine)

Dates: 1875–1923

Architect: Paul Abadie (1812–1884)

Because of its site in Paris and its perennial whiteness, the Basilica of the Sacré Cœur—almost universally referred to simply as Sacré Cœur—stands out in Paris as fully as the Eiffel Tower. It sits atop the hill of Montmartre, part of the ridge that circles Paris to the north, not far from the studios of such early twentieth-century artists as Braque and Picasso. Its striking whiteness is a result of the stone its architect chose, a special type of limestone from Chateau-Landon, that resists staining and dirt. Even when Paris was a smoke-darkened city, before the 1960s, Sacré Cœur shone white on the hill. Its silhouette of five elongated domes and its tall bell tower are consequently as immediately recognizable when entering Paris from the north as from within the city, and the view from the plaza in front of the church is one of the most spectacular in the city. On a clear day (or night), the whole of Paris spreads out; from the top of the dome, the highest point in Paris next to the Eiffel Tower, one can see 30 miles in all directions.

Neither Parish Church Nor Cathedral

Neither the church nor the government proposed or financed Sacré Cœur. Individuals, especially Alexandre Legentil and Hubert Rohault de Fleury, started a campaign to raise private funds for what they insisted must be neither cathedral nor parish church, but a pilgrimage church. They believed France's defeat by the Prussians in 1871 was punishment for a century "without religion" in France and believed this church would help atone. The French National Assembly set up a competition in 1873 to choose an architect. Although the jury established to judge the competition entries was made up of some of the most illustrious names in architecture including Charles Garnier, who was architect of the **Paris Opera**, Viollet-le-Duc, undoubtedly the most famous architect in France at the time, was not included.

Paul Abadie's scheme was chosen, and the first stone laid in 1875. Difficulties with the foundations, which had to be sunk to a depth of 100 feet into



Sacré Cœur (1875–1923), the Basilica of the Sacred Heart of Christ, gleams white on the northern horizon of Paris. An eclectic mixture of forms (Romanesque and Byzantine), it was designed by Paul Abadie who is also famous (or infamous) for rebuilding the Romanesque church St. Front in Périgueux.

clay, took three years. Construction of the *crypt* began in 1878, and on the upper church in 1881. When Abadie died, three years later, a series of architects took over. Sacré Cœur was finished by Lucien Magne. It was opened to the public in 1891, but decorations and the outbreak of World War I postponed consecration of the church until October 16, 1919, and the mosaic decorations, which were begun in 1900, were still unfinished at the consecration. The stained-glass windows, which were created between 1903 and 1920, were badly damaged by bombing in 1944 and restored in 1946. In the end, the church cost almost seven times Abadie's original estimate, partly because of problems with foundations, and partly because the domes were increased in size after Abadie's death. The Basilica of Sacré Cœur has belonged to the city of Paris since 1905.

Site Selection

Monsignor Guibert, a church official, chose the site for Sacré Cœur. It was he who wanted to see the hill of Montmartre crowned with a dome, and this partly accounts for the choice of Abadie's solution, an eclectic mix of *Romanesque* and *Byzantine* architecture. Abadie used the early twelfth-century church of **Saint Front** in Périgueux, which he had largely rebuilt, as a starting point for his design. Like St. Front, and St. Mark's in Venice on which it was based, Abadie's plan for Sacré Cœur is a *Greek Cross* (equal-armed), not a *Latin Cross* (three short arms and one long). All three churches have five domes, but Abadie changed their arrangement. St. Mark's and St. Front's domes are placed over the four arms and their crossing; the plan is a *quincunx*, like the five spots on a die. Abadie inscribed his Greek Cross in a square and placed the domes over the four corners of the square and the crossing. He also used modern engineering to dramatically reduce the size of the piers holding up the domes, a drawback in the earlier churches since the massive piers limited sight lines. He also added a huge, semicircular apse to the rear of the church for the high altar and seven chapels. All of these additions and modifications were necessary because of the pilgrimage designation: Pilgrims need large spaces to assemble and for processions, as well as numerous chapels so multiple services can be carried on at the same time. (It is the pilgrimage function that determined the basilica designation. The plan is not what architects refer to as a basilican plan, a rectangular plan with a nave and side aisles.)

Statistics

The church is huge, 280 feet wide and 115 feet long. The dome rises 272 feet above the floor and is more than 50 feet in diameter. The bell tower or campanile, finished in 1914, is 308 feet high and houses one of the largest bells ever made, "the Savoyard," which weighs 19 tons. It was cast at Annecy, in east central France, in 1895.

Critical Reception

For most of the twentieth century, Sacré Cœur was considered as much a symbol of bad taste as a symbol of Paris. Even at the time of the competition, Abadie's entry was ridiculed by some as looking too much like a mosque, like Hagia Sophia and Sinan's domed mosques in Istanbul. Sacré Cœur also was received poorly due to the condemnation of Abadie's "restoration" of St. Front, in which he destroyed much of what was authentic and added many features of questionable quality. To many, Sacré Cœur represented the same lapse of taste.

Also, Abadie's successors changed the church in ways that architectural critics found tasteless. They made the domes much taller and more pointed than Abadie had designed, making them look as if they had been "squeezed."

Because of the changes, they also look crowded together and entailed modifications that make the church very dark inside. Finally, the church generated controversy because of both political and religious associations. The groups that built the church, both the government that authorized it and the private group that raised construction costs, were very conservative. Most people now tend to look more indulgently at nineteenth-century architecture, and the political and architectural controversies that caused so much of the negative criticism seem very old-fashioned.

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SAINT DENIS, ILE-DE-FRANCE, NORTH OF PARIS

Style: Gothic

Dates: 1136–1144 and after

Architect: Unknown

St. Denis, the First Gothic Church

On June 11, 1144, the splendid new *chancel* of the abbey church of St. Denis, with its twenty-four altars, was consecrated. The ceremony was so important that King Louis VII of France, his wife, Queen Eleanor of Aquitaine, twenty-three bishops, the archbishop of Bourges, the abbot of St. Denis, and many other notables were present. For one of the few times in history, an entirely new approach to architecture, the Gothic, had been invented at single stroke and in a single building. Those who attended the service recognized just how brilliant and new the chancel was, and many, almost immediately, began rebuilding the churches for which they were responsible in the new style. It was based on a system of building that permitted unprecedented drama and lighting effects in a church. Since the building was supported on freestanding columns instead of thick walls, the exterior walls

between the columns carried no weight, were mere curtains, and could be built entirely of windows filled with stained glass. Instead of being dark, as most previous churches had been, the new chancel seemed light and airy, the air itself seeming to glow with colored light.

The head of the *abbey* connected to the church, Abbot Suger, was very proud of what he and his architect had accomplished. He wrote: "The church shines in its illuminated center, because luminous is that which is luminously coupled with the Light, and luminous is the noble building invaded by the new brightness. It is I, Suger, who has, during my time, enlarged this building. This has been done under my direction." Suger left his name and his image in many places so that succeeding generations could know who was responsible for the revolutionary new architecture; the name of the architect is, unfortunately, not known.

The abbey church of St. Denis is one of the most important buildings in France for yet another reason. For centuries, it was the burial place of the kings of France, the last of whom, Louis XVIII, was buried there in 1824. As a royal necropolis, containing one of the finest collections of Medieval and Renaissance sculpture in France, it became a symbol of the king's divine right to govern France.



Abbot Suger is generally credited with creating the first Gothic architecture when he ordered the west and east ends of the abbey of St. Denis, just north of Paris, rebuilt (1136–1144).

St. Denis the Person

The church has always been dedicated to St. Denis, although for centuries it was unclear to which St. Denis. There were three personages named Denis associated at one time or another with the church. The confusion was resolved, or rather circumvented, in the ninth century, when the Church declared that all three should be considered one saint. The oldest of the three, Dionysius (Denis) the Areopagite, is mentioned in the Bible as Paul's first disciple in Athens. A fifth-century monk used the same name and is now referred to as Dionysius the Pseudo-Areopagite. The third Denis was the first bishop of Paris. Around 250 C.E., he attempted to convert pagan Parisians, some of whom refused his efforts and decapitated him. According to legend, he, in turn, refused both to die immediately and to be buried where he was martyred. He picked up his head and walked several miles north of Paris, indicating where he wished to be interred by laying down his head and, presumably, his body. Denis's burial place was revered from that time. A church was built over it in 475 C.E. by St. Genevieve, the patron saint of Paris, who had saved the city from Attila the Hun. Her church was enlarged several times by the Merovingians, the first royal family to reign (roughly 500–751 C.E.) after the Roman Empire in France collapsed. In 638, King Dagobert, who had commissioned one of the rebuildings, was buried next to St. Denis, beginning the long tradition of royal burial.

The Earlier Churches on the Same Site

Charles Martel, the founder of the succeeding dynasty, was also buried in St. Denis, as was his son, Pippin the Short. The pope's crowning of Pippin, the first king of the dynasty in St. Denis in 754, made it central to subsequent kings' strategies of strengthening their claims to ruling all of France. Pippin recognized its enhanced significance by commissioning a new, much larger church that his son, Charlemagne, finished and consecrated. Of this *Carolingian* church and abbey, which fell into ruin during periods of abandonment occasioned by Viking raids, only parts of the *crypt* can still be seen.

Hugh Capet, founder of the next dynasty of French kings, restored the buildings and officially established St. Denis as the royal necropolis and the abbey as guardian of the insignia required for coronations, which, with rare exceptions, were celebrated in **Reims Cathedral**. The *monastery* connected to the church became renowned as a center of learning and its abbots important royal advisors.

Abbot Suger was the most important of these, counselor to Louis VI and Louis VII. Suger's prestige was so great that he ruled France as regent during the Second Crusade (1147–1149) in the king's absence. This authority encouraged and inspired Suger, who was, it should be apparent by now, not an especially modest man, to transform the church of St. Denis into the seminal work of Gothic architecture. He had a right to be proud. It is worth

stressing: There are few—if any other—buildings in the history of architecture that so clearly initiated a new style of architecture, and Suger knew it.

The Innovations in St. Denis

In 1136, he began by rebuilding the *narthex*, an almost autonomous foyer for the church. In overall form and details, Suger's narthex building was not substantially different from many others that had been built in northern France. It is a two-storied, rectangular block surmounted by two towers, only one of which still exists. The main block is surmounted by *battlements* derived from military architecture making it, symbolically, a triumphal entry gate for a castle and declaring that the church is the castle of God ("A mighty fortress is our God") and not incidentally of the king, God's representative on earth.

If the idea of a narthex building was not new, the great circular rose window that lights the chapel on the second story of the narthex was the first of its kind. It would be echoed in most subsequent large Gothic churches. The general scheme of the three entry doors and their sculpture is also innovative and would, in outline, inspire the portals of many other churches, such as the cathedrals of **Notre Dame** in Paris and **Chartres**. The sculpture above the center door represents the Last Judgment, with Abbot Suger (naturally) at the feet of Jesus. The sculpture above the south door represents St. Denis taking communion, and above the north door St. Denis being beheaded. On the columns next to the doors were symbols reinforcing the royal connection with the abbey.

Less apparently new than these features, though of much greater architectural consequence, was the system of pointed ribs that the architect used to build the vaults of the narthex. Suger's architect, who used the system somewhat tentatively in the narthex, fully realized what it made possible when he rebuilt the opposite end of the church almost immediately after the narthex was finished. The dark Carolingian nave was not rebuilt for another hundred years.

The Advantages of Gothic Construction

No single feature that made St. Denis the earliest example of the Gothic style of architecture was used there for the first time. The architect's genius was recognizing that by combining them, he could create something spectacularly new. The first feature, the pointed *arch*, allowed the architect great freedom in the shapes he could use in the plan of the church. Although architects had begun to use pointed arches before St. Denis was rebuilt, mostly architects (both Roman and Romanesque) had used semicircular arches. A half circle was both symbolically (the perfect circle being a symbol of God's perfection) and aesthetically appealing, but it introduced several limitations for the architect. Since the height of a semicircular arch is half its diameter, the columns supporting a series of arches (an arcade) must be separated by the same diameter if the arches are to be of equal heights. This is usually

aesthetically important; it is structurally critical when arcades are connected by vaults to create the walkways—aisles and ambulatories—as well as the *nave* ceilings of a church, which severely restricted the size and shape of the bays, the structural units of a church. A pointed arch has an arbitrary shape that can be adjusted for different spacing between columns while maintaining a constant height, permitting the architect to create variable shapes, sizes, and arrangement of supports.

Ribs are a second component of the Gothic system. Earlier, Romanesque vaults, typically round in cross-section, were mostly smooth on their underside. Flat bands (called *doubleaux*) were sometimes introduced above columns to direct part of the weight of the vaults onto the columns and from them to the outer walls of the churches. Because the vaults exerted strong forces that pushed out the top of the columns and outer walls, these needed to be thick and buttressed by other walls or they would be overturned. A pointed arch and a pointed vault, because of their geometry, press almost straight down on supporting walls or columns, reducing or eliminating the overturning forces. If all these arches and the arched intersection of vaults (*groins*) are connected with thin stone ribs, all the weight and other forces of the building can be concentrated at points; that is, onto relatively thin columns or piers. Thick columns (*piers*) and walls can be largely eliminated, making possible the third innovation: point-support or skeleton construction, the same sort of structural frame that made large buildings like skyscrapers possible.

A Gothic structure, such as that at St. Denis, resembles the skeleton of a mammal. The ribs of the church carried forces exerted on them to a multitude of columns much as the ribs of a mammal's chest disperse forces on them to the spine and from there to the ground by way of the legs. Just as the tissue between ribs are thin webs of muscle and skin, the vaults between the ribs in a Gothic structure are thin panels (also called webs) of stone, and the walls between the columns on the exterior of the building can be thin tissues of glass. Structurally, a Gothic church dances lightly on its columns, whereas the typical Romanesque church sits solidly on walls and thick piers. This difference results in a dramatic reduction in the amount of stone needed to support a Gothic building. Psychologically as well as physically, a Gothic church built on this system gives the sensation of lightness.

In the chancel of St. Denis, its architect arranged seven chapels along lines radiating from the center of the *apse*, effectively the high altar, and added two more to make a transition from the rounded end to the straight sides of the chancel. The new ribbed groin vaults covered these chapels as well as the *ambulatory*, the passageway between them and the apse containing the high altar. Views through the resulting layers of space from the chancel to the outer walls, which are filled with some of the oldest stained-glass windows in France, are dramatic and entrancing.

The Symbolism of the New Style

According to Suger, the chancel, with its semicircular plan and glowing jewels of colored glass, made the “first crown of Light” in architecture that represented, for him, the presence of God. The symbolism extended further; for example, the twelve outer columns on the lines radiating from the chapels represented the twelve Apostles and the twelve inner columns represented the minor prophets. This chancel, with its flowing spaces and the radiance of the stained-glass windows, would serve as a model for most of the major churches and cathedrals in France and many in England and across Europe for the next two centuries.

The Later Completion of the Nave

Suger died (1151) before he could rebuild the nave in the new fashion. It was not until 1231 that work was begun again to rebuild the old Carolingian nave. A series of architects, while keeping the lower parts of Suger’s chancel, radically changed the upper parts and added *transepts* that expanded the width of the church enough so that it could become the royal mausoleum of France. Rose windows, which had been introduced in Suger’s main facade, were introduced into the transept facades, and the windows of the new nave and rebuilt apse now entirely filled the spaces between columns above the nave arcades. Suger’s church had become more than luminous, it was now light-filled. These new additions are some of the most successful of the fashionable thirteenth-century style of Gothic architecture known as Rayonnant (named for the radiating pattern in the rose windows). St. Denis had continued to be at the forefront of the development of Gothic architecture.

The church fared much less well in the succeeding centuries. Additions were begun but never completed and pulled down, and the monastery attached to the abbey church was demolished in 1719. In 1771, the facade was badly damaged in an attempt to enlarge the entry. After the French Revolution, the treasury and the lead roof were removed and melted; the tombs were desecrated and many of them destroyed. Most of the stained glass windows were broken or destroyed. The famous French writer Chateaubriand wrote: “Saint Denis is now deserted. The birds fly through it, grass grows on its shattered altars, and instead of the funeral services that once echoed round its vaults, all that is heard today is the patter of raindrops through its gaping roof, a pebble rolling off its ruined walls, or the noise of the clock reverberating in the empty tombs and wrecked underground passages” (Brankovic 1990, 16). The church was transformed, like many others in France, into a “temple of Reason.” It also served, variously, as a grain warehouse and a military hospital.

Napoleon, when he became emperor, ordered the church to be restored, but it was badly done, and in the past century or so, many of these “restorations” have had to be reversed. In 1918, weapons stored nearby exploded and

destroyed a number of the stained-glass windows that had survived. Since then, St. Denis has undergone extensive restoration and is again a glorious building. The ancient stained glass that remains is some of the most beautiful that exists anywhere, and if the more recent stained glass is not quite as good as the old, it still gives the sense of how the interior once appeared. Many of the tombs shattered during the Revolution have been restored and are visited today by those interested in the history of France—including the descendants of those buried in the tombs.

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SAINTE-CHAPELLE, PARIS

Style: Rayonnant Gothic

Dates: Circa 1241–1248

Architects: Uncertain; traditionally (but unlikely) Pierre de Montreuil; possibly either Thomas de Cormont or Robert de Luzarches; restored by Jean-Baptiste Lassus and others

The Jewel Box of Medieval Architecture

King Louis IX of France—St. Louis—built the Sainte-Chapelle as his palace chapel and to contain what he believed to be the most precious relics of Christendom, the Crown of Thorns used to torture Jesus before the crucifixion and a piece of the True Cross on which he was crucified. The Sainte-Chapelle was, therefore, quite intentionally designed as an architectural reliquary, an architectural jewel box, that contained the elaborate gold

boxes covered with jewels that in turn contained these most precious “jewels of Christianity.”

During the Middle Ages, many churches were built to house various other relics (any objects considered holy, for example, the bones of saints), and drew huge crowds but they were also parish churches, abbey churches, and cathedrals. In a sense, the accommodation of relics was a secondary function. (For more on these churches, see, for example, the entries for the abbey church at **Vézelay**, built to house the supposed bones of Mary Magdalene; and for **Chartres Cathedral**, to house what was believed to be the nightgown Mary wore at the birth of Jesus.) As the king’s private chapel, which contained his personal reliquary of religious objects, the Sainte-Chapelle was quite different. It had to reflect his royal person and is so precious and elegant that it appears to have been conceived by a goldsmith rather than an architect. Its walls of stained glass glow like the precious stones on the reliquaries it once housed. It appears elegantly simple, but this simplicity is an illusion. Like a magician, the architect hid his tricks, in this case, an extensive and advanced system of iron reinforcing.

A symbol of the king’s power, the Sainte-Chapelle visibly linked the Crown of Thorns with the royal crown, reminding everyone that God had bestowed the crown on the king. Its great splendor was probably calculated to contrast to the king himself, a deeply religious man who lived and dressed modestly. He controlled access to the Sainte-Chapelle; the only entry was from the second floor of the king’s palace, which at this time was on the Île de la Cité, the island in the center of Paris on which **Notre Dame** was also built. (The king’s palace was later moved across the Seine River to the north. See the entry for the **Louvre**.) He admitted guests as special favors. The stairs by which one enters today were originally service stairs.

The Sainte-Chapelle could have been begun as early as 1239—the Crown of Thorns arrived in Paris on August 8th of that year—but most scholars think it was begun in 1241 or 1242. It must have been substantially finished by the time it was consecrated on April 26, 1248, the same year Louis IX left from **Aigues-Mortes** on the Seventh Crusade, after appointing a college of *canons* to look after the Sainte-Chapelle while he was gone. The person in charge of the chapel became, and long remained, powerful; he was variously called Master Chaplain, Master Governor, Treasurer, Arch-chaplain, and, during the reign of François I, even Pope of the Sainte-Chapelle. To speed construction of it, the king spent a considerable sum—40,000 livres, according to most sources. Though difficult to judge the equivalent in today’s money, the extravagance of the chapel does suggest that the 35,000 livres he was said to have paid for the Crown of Thorns and the piece of the True Cross must have been staggeringly large.

King Louis had bought the relics from Baudoin II (or Baldwin) of Courtenay, the last Latin emperor of Constantinople. (The Crusaders had taken Byzantium, the capital of the Eastern Roman Empire, in 1204 and installed

their own “Latin” emperor.) By 1236, Baudoin was so broke he demolished parts of his palace for firewood and pawned the relics to the Venetians to raise more funds. Unable to reclaim them, he sold the Crown of Thorns and the piece of the True Cross to King Louis IX. To these, Louis’s successors added, among other relics, objects reputed to be fragments of the Holy Lance, the Holy Sponge, the cloak and blood of Jesus, some of the milk and hair of the Virgin Mary, part of St. John the Baptist’s skull, and the Rod of Moses. It must be observed that, even at the time, many clerics were skeptical of the authenticity of objects supposed to be relics. St. Thomas Aquinas is supposed to have dryly remarked that there were enough pieces of the “True Cross” to rebuild Noah’s ark.

The relics kept in the Sainte-Chapelle were brought out every Good Friday, at which time the sick were permitted to touch them in the hope of being healed. Usually, though, they were kept in a richly decorated reliquary in an alcove off the chapel. The king showed them to visiting dignitaries and occasionally gave away small pieces. As a result of this practice, the Crown of Thorns, which has been preserved, no longer has thorns. A particularly magnificent reliquary was added in 1306. It contained the head of King Louis IX, who had been canonized in 1299.

The Classic Example of the Rayonnant Style of Gothic Architecture

By the time the Sainte-Chapelle was designed, nearly a century had passed since the Gothic style was introduced (see **Saint Denis**); thus, nearly four generations of architects had practiced and perfected the details, forms, and the structural techniques characteristic of Gothic architecture and had created a new form of Gothic architecture, the Rayonnant style. The Sainte-Chapelle represents the purest example of this approach. Rayonnant is a relatively new term—it was called *opus francigenum* in Europe of the time—that refers to the characteristic radial, sunburst patterns of *rose windows* of period. (See entry for **Reims Cathedral** for an example of Rayonnant rose windows.) The Rayonnant was more than a new fashion, it was in fundamental ways an architectural revolution that first appeared in the rebuilding of the *nave* and *transepts* of St. Denis, the same building that had introduced the combination of technical improvements that made Gothic architecture possible in the first place.

This new development in architecture, which occurred about 1230 to 1240 in the Paris area, was dependent on two innovations and a change in how architects designed buildings: the development of the independent window frame, the extensive and judicious use of iron reinforcing, and the use of plans and architectural details drawn on parchment. These three changes in architectural practice are interrelated, and without them, the Sainte-Chapelle could not have been built. Previously, windows had been openings in walls with stone members added to hold the glass. The new windows were independent stone frames that could be “prefabricated” independently of the structure of the building. With this development, the spaces between

the structural columns and buttresses could be completely filled with stained glass, but since they now helped little or not at all to stiffen the walls of the structure, those walls became weaker, less able to resist the forces that act in and on a building, especially the strong winds that blow in the north of France. The structure needed to be reinforced with wrought-iron bars in a way that anticipated the much later development of reinforced concrete (concrete reinforced with steel bars). In Rayonnant architecture, the iron was typically either hidden or discretely added to ribs and frames. In the Sainte-Chapelle, there are two horizontal bands, belts of iron (actually a series of 14-foot-long iron clamps) that go all the way around the building and are anchored in the west facade. One band is at mid-height of the windows, the second goes around the chapel at the springing of the vaults (the point at which the vertical columns begin to curve into the vaults). There are also iron tie-rods in the lower story of the chapel connecting the free-standing inner columns with the outer walls. An extensive system of iron tie-rods, out of sight under the roof, connects the tops of the buttresses straight across the flat part of the chapel and in a radial pattern in the *apse*. This system serves much the same structural purpose as *flying buttresses* in most Gothic churches and allowed the Sainte-Chapelle to be built without them, to have a relatively smooth exterior silhouette. There are also curved iron bars on both sides of some of the vault ribs, connected with large iron rivets passing through the *voussoirs* that make up the elegantly slim ribs of the vaults. This very extensive skeleton of hidden iron is what creates the illusion of a stained-glass box.

Both these developments, the windows and the incorporation of iron reinforcing, were dependent on the increasing use architects were making, around 1220 to 1230, of small-scale sketches on parchment to study, copy, and develop architects' designs and to communicate them to the masons in advance of construction. Drawings on parchment also meant that new ideas, forms, and details, could be carried from one place to another, assuring the unprecedentedly rapid spread of the Rayonnant style throughout much of northern Europe. The increased use of drawings may also explain the increasingly rectilinear character of Gothic architecture at this time, since straight edges were used in drawings.

The Architect of the Sainte-Chapelle

Possibly related to the increased use of drawings and writings, it is during this period that for the first time in history, architects' names are frequently mentioned in surviving documents. Chief among them are Jean de Chelles (died around 1260) and Pierre de Montreuil (died 1267), who designed the transepts of Notre Dame in Paris. A legend crediting the latter as the architect of the Sainte-Chapelle cannot possibly be true, but it is worth mentioning because of what it suggests about the Medieval architect. According to this story, because the commission for Sainte-Chapelle was the most prestigious in Europe at the time, architects from all over Europe came

to compete for it. One of them, seeing the plans of another architect along the way and realizing how much better that architect's plans were, killed him in a jealous rage and burned his drawings. Guilt caused the murderer to become a desperate drunk; he finally convinced a Dominican monk to let him enter a monastery to atone for his crime. There, he taught a young pastry cook named Pierre everything he knew about architecture and gave Pierre drawings for the king's chapel, which the king liked. Even though Pierre admitted the plans had been drawn by another who wished to remain anonymous, the king commissioned Pierre to carry out the designs. This Pierre became the famous Pierre de Montreuil; the Dominican monk was Thomas Aquinas. The legend is very unlikely for several reasons, not least because the Sainte-Chapelle is such a brilliantly accomplished design, both aesthetically and technically, that the architect must have been very experienced when he designed it. Second, many of the chapel's details are very similar to many of Amiens Cathedral (but not of Notre Dame in Paris), so similar that many now think that Robert de Luzarches, the architect of Amiens Cathedral, or Thomas de Cormont, one of his successors, was also the architect of the Sainte-Chapelle.

Architectural Characteristics of the Sainte-Chapelle

Whoever the architect, he faced challenging practical as well as aesthetic problems. Aesthetically, the chapel had to look both "royal" and be an appropriate container for the precious relics. Functionally, it had to be two stories high with a lower, ground-level chapel (dedicated to the Virgin Mary) for the palace servants and an upper level that had to connect directly to the main floor of the palace. Given the range of acceptable proportions in a Gothic structure, these functional requirements determined the overall dimensions of the building: 35 feet wide, 108 feet long, and 67 feet high. These limiting dimensions meant that the lower floor was less than 22 feet high, and if spanned by a single arch, as is the case in the upper chapel, that arch would have to begin its curve at ground level. That would leave inadequate headroom for the worshipers. The architect solved this problem by inserting intermediate columns, too close to the wall to form aisles, to reduce the span, thus the point at which the arches began to curve. He then connected the columns to the walls with small flying buttresses (and some of the concealed iron reinforcing) to help absorb the outward thrust of the ribs and vaults. The resulting interior is both spatially more interesting and perceptually lighter than it would have been with a single arch, and also has more headroom.

It is unusual to see flying buttresses inside a Gothic church; it is at least as unusual not to see them on the outside, another functional and aesthetic problem solved by the architect. Flying buttresses, arches that appear to sail through the air from the tops of walls to freestanding (and often massive) vertical piers and are so characteristic of most Gothic churches, would

have complicated the exterior appearance, creating a far less elegant appearance. They would also have cast deep shadows on the stained glass, considerably reducing its impact on the interior. Instead of the flying buttresses, the architect used short walls perpendicular to the plane of the glass. They extend from the ground to the beginning of the slope of the roof and are entirely on the outside of the glass wall. Only elegantly thin stone *colonnettes* (relatively small, thin columns) attached to their inner face appear on the interior. They do not look large enough to support the stone vaulting, which seems instead to be—improbably, miraculously—held up by the walls of brilliantly glowing glass. The result is breathtaking but serene. There are four bays of stained glass that form each of the straight sides of the single nave; seven bays form the curved apse. All the bays are filled with glass from colonnette to colonnette and from a low stone wainscoting to the bottom ribs of the vaults. It should be remembered that there is more here than meets the eye. Only the hidden iron reinforcing makes the improbable possible.

The Stained Glass

There are 1,134 religious scenes in the 6,672 square feet of stained glass in the Sainte-Chapelle. That alone would make it one of the most important Medieval monuments in France. Artistically, the quality of the glass is very high, too. Even including the sections that were restored and recreated in the nineteenth century—so well that it is very difficult to distinguish them from the original glass—the windows are unparalleled in their completeness and uniformity of style. As many as three different groups of artists may have been involved in creating them. These workshops were undoubtedly influenced by those who created the extraordinary windows in Chartres Cathedral, but they developed their own style. For one thing, the Paris artists did not separate the dominant red and blue colors, so characteristic of both sets of windows, to the same degree as at Chartres, so that in the Sainte-Chapelle the two colors combine, producing the impression of an overall violet color. Contemporaries referred to some wines as having “the color of the windows in the Sainte-Chapelle.” Also in the Paris windows, the metal framework for the glass is more complex and is consequently a more important part of the compositions.

The scenes in the windows of the straight nave walls are mostly taken from the Old Testament. In the first of the seven bays of the apse, the scenes refer to the relics, and in the remaining bays to the life of Christ. All of the stone, in the windows as well as in the vaults, is painted; the vaults are blue with gold stars, and the stone in and around the windows is covered with colors that handsomely complement those in the stained glass. Even though the painting is modern, from the nineteenth-century restoration, it was based on remaining traces on the stone and is considered fairly accurate. It gives a good idea of how much people in the Middle Ages loved bright color, though

not all churches were painted to this extent. Both the paintings and stained glass in the lower chapel are more speculative restorations, the originals having been destroyed in a flood of 1690.

The Sainte-Chapelle after Louis IX

Several modifications were made to the chapel over the centuries. A small-scale version of the Sainte-Chapelle called “The Trésor-des-Chartes” was added to it in 1383, as sacristy and archives. It was destroyed in 1776, when law courts replaced the royal residence. In the fifteenth century, a mechanical angel that descended from the vaults during Mass was introduced to the interior, and a statue that revolved was added on the roof. Charles VII restored the building later in that century and replaced the west rose window with the splendid *Flamboyant* rose that one sees today. Louis XII had a staircase built from the outside so he could follow the Mass without being seen, and during the reign of Henri II (1547–1559) a new rood screen (*jube*), which disappeared after the French Revolution, was installed. The *flèche*, the spire on top of the roof, has been replaced at least three times. Most recently (1854), the master carpenter Bellu built one in cedar which he based on old documents and the fifteenth-century version. At 246 feet tall, it is visually light, even lacy.

Although not torn down after the French Revolution, the Sainte-Chapelle, as a symbol of royalty, was viciously attacked and vandalized. As they did with many other churches, the Revolutionaries removed all furnishings and sent the reliquaries to the mint to be melted down. Sculpture containing symbols of royalty were chiseled away, but other statues were saved and moved to a museum or other churches. The upper chapel was turned into a club, then into archives for the law courts, at which time parts of the stained-glass windows were sold, mostly to the English.

Jean-Baptiste Lassus, the architect who collaborated with Viollet-le-Duc on the restoration of Notre Dame in Paris, proposed to restore the Sainte-Chapelle in 1836. He did not receive the necessary funds and authorization for ten years, but had largely finished with the restoration by his death in 1857. The restoration, particularly the painting, was completed by the architect Boeswilwald, who also finished the restoration of **Saint Front** in Périgueux. The statues of the twelve apostles that had ringed the upper chapel were superb examples of Gothic sculpture from the period and, like the architectural details, closely resemble the contemporary sculpture of Amiens Cathedral. After the Revolution, some had been dispersed to St. Denis, some to the Museum of French Monuments, one to a church in Créteil, others to Mount Valérien. They were reassembled in 1844 as part of the restoration, but only half were in good enough condition (including two that had lost their heads) to be replaced in their original positions. The others were replaced with copies and the originals deposited in the Cluny Museum of Medieval art in Paris.

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ST. ÉTIENNE CHURCH. *See* Abbaye aux Hommes (Men's Abbey)/St. Étienne.

SAINT FRONT, PÉRIGUEUX

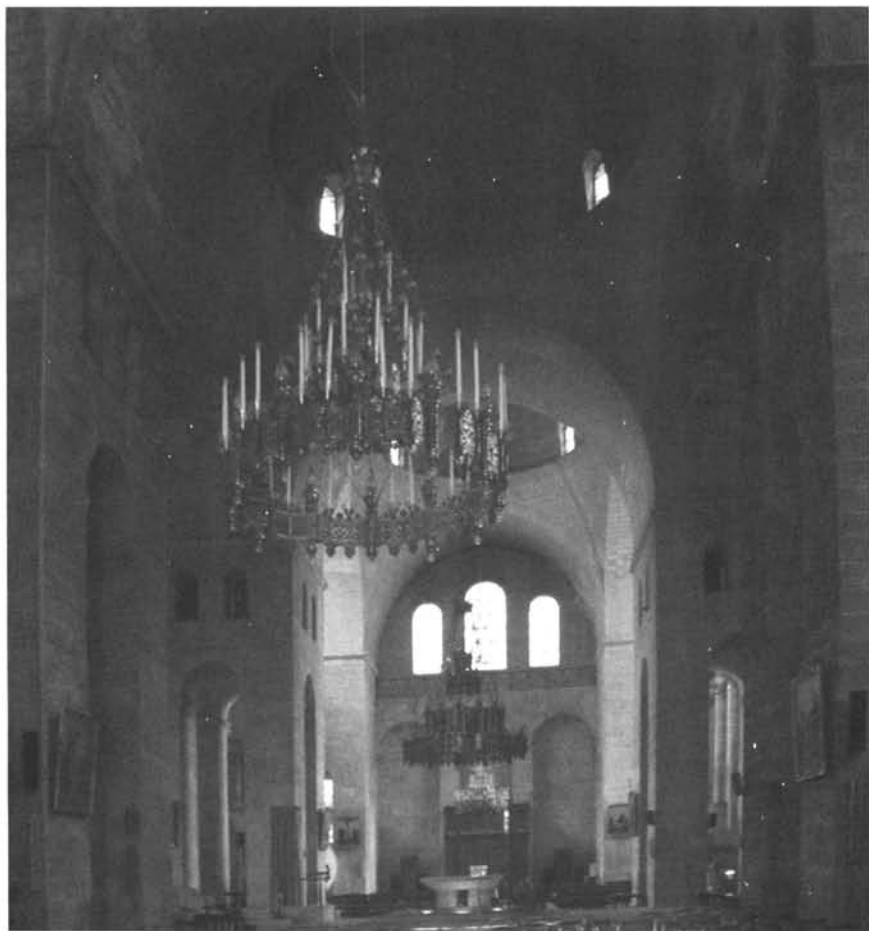
Style: Nineteenth-Century Reconstruction of Romanesque Church

Dates: Beginning of Construction Uncertain, circa 1140; finished
circa 1173

Architects: Romanesque architect unknown; architect for rebuilding,
Paul Abadie (1812–1884)

St. Front's picturesque silhouette of five white stone domes and tall bell tower dominates the old city of Périgueux. It seems exotic, more like St. Mark's Cathedral in Venice than the more familiar and typical French Romanesque churches such as **Saint Sernin** in Toulouse or **Fontenay Abbey**. It is, however, part of an alternative Romanesque tradition of domed churches limited to a region along or near an ancient Roman road in west central France that connected Rodez to Cahors and Saintes. Traffic along the road, still well traveled in the Middle Ages, helps to explain how and why a tradition of covering churches with domes spread throughout the region to places like Angoulême, Poitiers, Nantes, Solignac, and Fontevault, but it does not explain the influence from Byzantium, from the Eastern Roman Empire, by way of Venice.

St. Front is one of the largest churches in southwestern France and



St. Front at Périgueux, begun about 1140 and finished about 1173, is the best known of a series of domed churches in west central France. Paul Abadie almost completely (and controversially) rebuilt the church in the nineteenth century.

would be considered the masterpiece of the domed churches, except that it was extensively rebuilt rather than restored in the nineteenth century. Paul Abadie began the reconstruction of the church, which was in ruinous condition, in 1852; Bruyère and Boeswilwald completed it after his death in 1884. These architects, especially Abadie, removed some elements, radically altered some, and added new ones, for example, seventeen small bell towers. Even in its present form, however, St. Front is a fascinating church, unique in all respects among French churches, and its austere, virtually undecorated interior appeals strongly to modern tastes. Abadie's rebuilding was not, in any case, the first time the church dedicated to St. Front had been rebuilt.

The Earliest Churches Dedicated to St. Front

St. Front was the first bishop of Périgueux, a city named for the local Petrocorii tribe. Their settlement was taken over by the Romans, who made it into one of the most beautiful cities in Aquitaine (what is now southern France). It was destroyed in the third century C.E. by the Allemanni, barbarian invaders. What was left of the city was turned into little more than a village by a succession of other barbarian tribes (Visigoths, Franks, and Normans).

Sometime before the sixth century, a hermit named Front, whom people described as performing miracles and chasing demons, lived near this village. His tomb, in a small chapel that he had built and dedicated to Notre Dame (French for Our Lady, that is, the Virgin Mary), attracted numerous pilgrims, but the chapel became too small to accommodate them. In the sixth century, the Merovingian bishop Chronope built a larger structure near the tomb, which may have been close to a grotto found in 1872, under the present apse of the cathedral. Chronope dedicated the new church to Front, now considered a saint, and moved his remains to its crypt. A small monastery and village grew up next to the church, which attracted so many pilgrims that the village became more important than the existing town, which united with it to create Périgueux in 1251.

Bishop Chronope's chapel was enlarged during the *Carolingian* period and consecrated in 1047. It was destroyed by a fire in 1120 that left only walls and a few other fragments. From these, archeologists have determined that the Carolingian church was quite small and was divided into three *naves*. St. Front's crypt was probably originally under the *choir*, the part of the church that contained the altar. It was torn down around 1140, when the Romanesque church was begun. Two of the chapels that framed the Carolingian choir on the north and south were retained, however, and the distance between them determined the dimensions of the new church, which was finished about 1173. The Carolingian choir, with St. Front's tomb underneath, was originally retained as the choir of the larger new church, but perhaps because of ever greater numbers of pilgrims, the church was reoriented and St. Front's tomb moved to a new *apse* and choir that was built on the opposite, east side of the new Romanesque structure.

The New Church of St. Front

Both the plan and the method of covering the new church were exceptional in France. Typically, churches had *Latin cross* plans: the long upright for the nave, the three short arms for the choir and the *transepts*. St. Front has a *Greek cross* plan (four identical arms), the same as St. Mark's basilica in Venice, which was begun eighty years earlier. This type of plan was characteristic of Byzantine churches such as the Church of the Holy Apostles in Constantinople (modern Istanbul), the capital of Venice's major trading partner. In St. Front and this type of Byzantine church, the arms and their in-

tersection (the *crossing*) were covered by stone domes. It is obvious why St. Mark's was modeled after the Byzantine models, but no one knows the connection between these and the architect of St. Front, though there must have been one.

It was the plan, not the stone domes, that was new in the region around Périgueux. Stone domes had been used in France continuously since antiquity, most often in churches over the crossing. In the period immediately before the church of St. Front was rebuilt, architects in the region had begun to experiment with using stone domes to cover other parts of the church. Although complicated to construct, the domes permit the opening up of vast spaces in buildings since most of the forces exerted by their weight can be concentrated on four piers, making supporting walls unnecessary except as enclosure. Such walls can have as many windows as desired since they no longer hold up anything but themselves. On the other hand, the supporting piers need to be extremely large, restricting views in the interior. The larger the dome, therefore, the better.

St. Front's five domes are each more than 40 feet across and supported on massive square piers, 20 feet on a side. The mass of the piers is visually lightened by passageways cut through their centers at ground level and by small rooms lit by one or two openings on an upper level. Broad stone arches that are the width of the piers connect them to each other at their tops. From the top corners of the piers, spherical triangles called *pendentives* curve upward, their bases meeting to create the circular ring from which the domes spring. This ring is slightly in front of the lowest surfaces of the dome, making it both support and a frame. Unlike the inner surface, which is smooth, the outer surface of the domes is a fish-scale pattern of stone plaques set on a tall base of stepped rings.

St. Front's interior is large, monumentally simple, breathtaking, and unforgettable. The bare, undecorated, exposed stone appears never to have been painted. (Most Romanesque and Gothic churches were painted bright colors, though they have mostly disappeared. Isoire's interior has been restored and gives an idea of the original colorful appearance of the Medieval church.)

Modifications to St. Front before Abadie's Restoration

St. Front was modified several times. Small apses were built as chapels onto the north and south transepts. Foundations for a bell tower were built inside the ruins of the old Carolingian church that, never roofed, serves as a ceremonial entry court. The old facade survived the fire and was kept in the rebuilding. It looks like a fortress, a sheer wall crowned by two short towers connected at their base by a *frieze*.

Though 119 of the 122 sculptures on the bell tower are modern, more of its original structure has been retained than in the rest of the church. The bell tower, which rises nearly 200 feet in four stories, looks square, but it starts as a distinct rectangle and only becomes square, story by story, through

a series of setbacks. Some of the bells in the tower, named after saints from the region, are quite old and have been organized into a carillon that plays on summer evenings. The top of the tower is new; the original finial was moved to the center of the cloister, part of Abadie's restoration. This cloister is the only part of the monastery to survive even in truncated fashion.

Abadie's Restoration

In 1575, during the Wars of Religion, the Protestants pillaged St. Front, dispersed its treasure, and destroyed the saint's tomb. The church was badly damaged again during the Fronde, the French civil war in the middle of the seventeenth century. In 1669, St. Front, which had been damaged less than the cathedral, was made the new cathedral. Though escaping destruction after the French Revolution, St. Front was not maintained. Its domes were in such bad shape they were covered by a hip roof of uniform height in 1790. Abadie restored a near ruin, it is true, but no one today would change as much as he did.

He made relatively minor changes to the plan apart from demolishing the genuine fourteenth-century Gothic chapel and replacing it with a semicircular apse like those on the north and south transepts. He also added the north porch, through which St. Front is now entered, except on ceremonial occasions. Abadie is most criticized for his restoration of the domes and vaults. The domes were originally different sizes and, though most were probably semicircular, the north dome was most likely pointed. When he rebuilt the church, he built all the domes the same size and shape and, though originally constructed of rubble masonry (roughly shaped stone), he rebuilt them with dressed (carefully cut) stone. In eliminating these and other irregularities, Abadie creating a homogeneous church that looks too modern to lovers of Medieval architecture, but by rebuilding the domes, he also got rid of the ugly eighteenth-century roof and created the beloved silhouette of domes. With some justification, Abadie replaced the more degraded sculptures and capitals in the church with replicas, but it is hard to understand why he removed any number of reliefs that were in good shape. Of the 137 sculpted capitals on the interior, 82 are by Abadie. He added many architectural elements to the church that had never existed, most notably the seventeen bell towers. In the cloister, too, Abadie redesigned and replaced most of the authentic Medieval stonework with minutely studied masonry, again in the name of homogeneity. If, in addition to Abadie's refashioning of the church, Charles Lameire's scheme to cover the interior surfaces with frescoes and mosaics had been carried out, we would have little idea of the appearance of the original Romanesque church.

In effect, Abadie created a new building, inspired by the Romanesque church, which he used as a model for **Sacré-Cœur** in Paris. Like St. Front, Sacré Cœur creates a dramatic, unforgettable, and immediately recognizable silhouette.

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STE-GENEVIÈVE CHURCH. *See* Panthéon.

SAINT MICHEL DE CUXA, PRADES, CATALONIA

Style: Pre-Romanesque

Dates: 956–974, with later additions

Architect: Unknown

St. Michel de Cuxa is an extremely rare extant example of a French church from the period of experimentation around 1000 c.e. that led to the great period of church building in the next two centuries. St. Michel is especially important in understanding how French Romanesque architecture developed because it shows the crucial role in that development that was played by Mozarabic culture, the culture of Christians who had lived in Muslim Spain and fled to the Christian north. These Christian refugees brought structural techniques and decorative motifs they had learned from the Moors, a people of mixed Arab and Berber (northern African) parentage. The second important influence seen in St. Michel is the revival of Roman building techniques. They had been preserved better in northwestern Spain (Asturias or Galicia) than anywhere else in Europe, since Galicia, unlike England, Ireland, and France, had never been devastated by northern invaders. Technical building skills had largely disappeared in France with the dissolution of the Western



St. Michel de Cuxa (956–974), built near the border of modern France with Spain, is a rare survivor from the period when Roman building techniques were being rediscovered and reinvented.

Roman Empire, and the infusion of this combination of structural and technical knowledge (vaulting and masonry techniques) and Moorish forms (horseshoe and lobed arches) is fundamentally responsible for the creation of Romanesque architecture. Pilgrims heading along the numerous pilgrimage routes to Santiago de Compostela were instrumental in diffusing the experiments in what is now northern Spain and southern France. (See the entry for **Saint Sernin** at Toulouse for more on the pilgrimage routes.)

The Sources of French Romanesque Architecture

St. Michel de Cuxa is in Catalonia, which is now split by the border between France and Spain. What remains of the monastery and church is now in France, about 19 miles north of the Spanish frontier and 30 miles west of Perpignan, the capital of the Languedoc-Roussillon region. Catalonia had been included in the Moorish conquest of Spain, which was largely complete by 718. Charles Martel stopped the Moors' advance through France near Poitiers in 732, and Charlemagne retook Catalonia at the end of the eighth century. St. Michel de Cuxa is dedicated to the saint closely associated with him.

When St. Michel de Cuxa was first founded around 880 c.e., about the same time as the first church of Santiago de Compostela, it had, according to Kenneth Conant, 50 monks, 20 servants, 30 manuscripts, 500 sheep, 50

mares, 40 pigs, 2 horses, 5 donkeys, 20 oxen, and 100 other large animals. Because the pope chose the abbey as the seat of his authority in Catalonia, it had grown rapidly. The original church, which the few remaining traces show had strong Mozarabic influences, was replaced by a much larger one begun in 956 and consecrated in 974. Small compared to the Romanesque churches of the following century, it nevertheless shows how dramatically size increased and building techniques improved during the tenth century. Although the masonry at St. Michel de Cuxa is still rough, the stones were carefully laid, and the masons used lime instead of dirt with gravel as mortar. Much of the tenth-century church, though reconstructed, still exists. It had a *nave* with short side aisles and a broad *transept* with a pair of small *apses* (apsidioles) on each arm. The apses opened to the transept through horse-shoe arches, and the nave extended past the transept and ended in an oblong, square-ended sanctuary.

At the end of the tenth century, Count Oliba Cabretto, part of the powerful Catalan family that supported both Cuxa and Ripoll (the most important abbey in the region), visited Italy for an extended period. When he returned, he established several Benedictine monasteries and rebuilt Cuxa. He added two towers, obviously inspired by north Italian (Lombardic) architecture, and weakened the Mozarabic features of the sanctuary somewhat by adding more chapels and an *ambulatory* (corridor) similar to those in French churches of the period, for example, at Saint-Philibert-de-Grandlieu. Abbot Oliba replaced the terrace and stairs in front of the west facade with an atrium and a chapel. His building campaign shows a reorientation of Catalonia from Spain toward France and Italy, and perhaps reflects Hugues Capet's coronation at Reims in 987, which was symbolic of more than a change of dynasty in France. It represented comparative stability after the political chaos caused by continuous invasions of migratory peoples.

The north tower, built by Abbot Oliba, fell during a storm in 1839, and all that remains of his rebuilding of the area to the west of the church is the crypt dedicated to the Virgin Mary. It has a rather interesting annular vault arranged around a central pillar 23 feet in circumference. Traces of the form-work for the vault are preserved. The crypt is preceded by a large passage-way of three naves for the pilgrims.

The Church after Oliba's Remodeling

What remains at St. Michel de Cuxa is a nave of six bays covered by a wood roof that rests on *diaphragm arches* (arches built in a transverse wall) that were rebuilt in the twentieth century. Arches of the nave arcade are supported by sections of wall rather than by pillars; it would be more accurate to describe the nave arcade as arched openings cut into the side walls of the nave. There are four windows on the south side of the nave, but no openings for light toward the north. The transepts are *barrel vaulted* and extend well past the side aisles; the Gothic, rib-and-panel vaulting of the two bays of the rectangular sanctuary were added in the fourteenth century after a fire.

Two long chapels terminating in semidomes are entered from the ambulatory around the choir.

At one time, St. Michel's cloister was the largest in the Pyrenees region, roughly 123 feet by 90 feet. Built in the twelfth century, it was Romanesque, not pre-Romanesque. Its south gallery was against the north side aisle of the church, the east gallery against the north arm of the transept.

St. Michel de Cuxa had begun to decline in the twelfth century and was near ruin by the sixteenth century. The last monk was expelled in 1793, after the French Revolution. Abandoned, the cloister was destroyed in the nineteenth century to create a reservoir for a foundry. Parts of the cloister were sold, especially to the Metropolitan Museum in New York and a museum in Philadelphia. Thirty-six capitals from the cloister survive in American museums and two in the Louvre. Few of the capitals, which were sculpted from rose marble, had religious themes, though two of them represented Christ. Most had vegetal and animal motifs, and a few had figures from pagan mythology. The cloister was partially reconstructed in 1952.

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SAINT PHILIBERT ABBEY CHURCH, TOURNUS (BURGUNDY)

Style: Romanesque

Dates: Late 900s through early 1100s

Architect: Unknown

St. Philibert at Tournus is one of the earliest churches built during the great cultural revival that occurred in France around the year 1000. A remarkable quality and quantity of light enters the church. Other, even much later Romanesque churches seem by contrast heavier, darker, cavelike. Because of the softness of the light diffused by an unprecedented system of *vaults* and



Saint Philibert at Tournus in Burgundy (late 900s through early 1100s) is nearly unique in its use of transverse barrel vaults, making it much lighter than most Romanesque churches. *Photo by Randy Seitsinger.*

the lyrical rhythm they introduce, St. Philibert can be described as “delightful,” a word not often used for Romanesque architecture.

St. Philibert was, nevertheless, imitated only once, in a local church; churches built during this period were more likely to be products of local cultures than later, when churches were typically built by a few groups of highly trained technicians who traveled around Europe. There were many isolated architectural experiments during this period when Roman techniques that had been disused in Europe for centuries were being rediscovered (thus the term “Romanesque” for the period). These churches may seem less so-

phisticated, less refined in detail, less splendid in ornament (stained glass and sculpture), and less technologically advanced than the later, larger churches, but that is part of their charm. They are a more direct reflection of the people who used them; their appeal is that of the folk song rather than the art song, and like folk music, these Early Romanesque churches and monasteries, above all St. Philibert, are outside of time, as modern as they are old.

Saints Valérien and Philibert

The first church on the site was a small chapel built over the grave of St. Valérien, a Roman who was beheaded shortly before the year 200 C.E. for converting members of the fortified Roman camp to Christianity. A new chapel, probably built on the site of the present crypt, which had replaced the original one by the sixth century, was destroyed by Arab invaders around 730. Monks driven by Norse invaders from the abbey of Noirmoutier, an island off the Atlantic coast of France, then took over the site, bringing with them the remains of the abbey's founder, Saint Philibert (616–685). They built a new church that was severely damaged by Hungarian invaders in 936. Pilgrims attracted by the tombs of the two saints now interred in the church brought enough wealth to finance decades of rebuilding, though political difficulties and a disastrous fire in 1006 interrupted construction. Vaulting of the nave was not begun before 1066 and was finished only in 1108.

A Fortress and a Church

Only the church has survived more or less intact from the original monastery. Traces of the wall that surrounded the monastic buildings (monks' dormitory, cloister, chapter house, storehouses, etc.) indicate that the monastery was little different from a castle with fortified entry gates. As the repeated destruction of churches on the site by invaders shows, during the early Middle Ages, monks had to be able to defend both themselves and the lay people that supported the monastery.

The western entry, though attached to the church, is a distinct building that still has the appearance of a fortress. Constructed around the year 1000, it is the oldest part of the church. Entry was through a large, rectangular vestibule whose vaulted ceiling is supported on four immensely thick columns. Connected to its south side is a much smaller room that now serves as the church's entry but was originally the *parloir*, a room where the public could meet and talk with the monks. A spiral staircase leads from it up to a chapel dedicated to St. Michael. Much taller (about 40 feet high) and lighter than the vestibule below, which is low and has only a few, small windows, it has a vaulted roof that is also supported on four thick columns. Arrow slots in the outer walls are reminders of the original protective function of the monastery. Although they appear to have been created by an amateur, perhaps one of the monks, the sculptural decorations of the St. Michael chapel are some of the earliest extant Romanesque sculptures and unforgettable masterpieces. A magnificent organ built by Gaspard Symon and Jehan de

Herville in 1629, one of the oldest organs in Burgundy, replaces the original apse of the St. Michael chapel and projects out into the nave.

The Vaulting of the Nave

Architects covered the naves in most Romanesque churches, even Late Romanesque examples like **Saint Sernin** at Toulouse, with a single, long, semicircular vault shaped like the roof of a tunnel or like a barrel split lengthwise (thus the terms *tunnel or barrel vault*). St. Philibert's architect used a series of much smaller barrel vaults that span across the width of the nave. His ingenious solution had several advantages. Long barrel vaults exert large forces that tend to overturn as well as crush supporting walls, which must consequently be very thick and have intermediate supports. Since neither walls nor vaults may be pierced with many or large windows, the result is the relatively dark interiors experienced in most Romanesque churches. St. Philibert's small, transverse barrels not only exert smaller forces, but also, except for end vaults, the forces of one vault cancel those in the next. (The entry building on the west and the east end containing the main altar absorbs the forces exerted by the end vaults.) Since the semicircular ends of the short vaults supported nothing, large windows let light directly into the nave, which their curved inner surfaces diffuse evenly throughout the entire interior. Great cylindrical piers are connected across the nave with arched walls (*diaphragm arches*) that support the sides of the barrels. Also, since the smaller barrels exert less force on the outer walls, they can be relatively thin with windows in their upper parts. Piers, arches, and most walls are made of small blocks of pink local stone. Light reflecting off these surfaces is given a rosy glow that imparts a psychological warmth to the interior. Side aisles are proportionately higher than was customary in the period, reinforcing an impression of spaciousness. A final advantage of this unique solution to roofing a church was primarily aesthetic. The vaults introduce a rhythm not seen in other Romanesque churches, a lyrical play of curve against curve, and round against planar.

While the nave is relatively undecorated, the east end of the church has many sculptures and sculpted capitals. It seems almost to constitute a separate, smaller church composed of the curved *apse*, which contained the high altar (moved forward in recent times); the straight-sided choir that connects apse to nave; and the *ambulatory*, a walkway wrapping around the choir and apse that gave pilgrims access to relics of the saints. This was probably the location of the original church over the tomb of St. Valérien, whose remains are now believed to be in a sarcophagus placed in a crypt under the central chapel of the apse. Several of the columns in the crypt were obviously reused from Roman buildings in the area. Saint Philibert's remains are in the central chapel directly above the tomb of St. Valérien and enclosed in a casket that has been at Tournus since 875.

A tower dominates the center of the church on the exterior. It is supported by cruciform (cross-shaped) columns at the crossing, the intersection of the

choir, the nave, and the transept. Though much smaller, it is typical of Romanesque architecture in Burgundy and resembles the crossing tower at Cluny. Its two top stories have open arcades of three arches on each side. They sit above a lower story with blind arcades (arcades with blank walls rather than openings behind them). The base of the tower is very plain, with a single arched opening in the center of each of the four sides. In 1778, the *canons* (the “board of directors”) of St. Philibert wanted to demolish the tower, but fortunately, they lacked the necessary funds.

In 1790, after the French Revolution, the monks were expelled and the church turned into a meeting place for the “Constitutional Club.” Three years later, the bells were removed. In 1802, St. Philibert was made a parish church. It was restored during the twentieth century. Only quite recently restored is the *chauffoir* or warming room, the only room that would have been heated. It now houses original pieces of sculpture replaced because of their damaged condition. The chapter house has also been restored; it was built in the Gothic style, much later than the church. Of the four original galleries (walkways behind columns) that defined the cloister, only one still exists.

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SAINT-SAVIN, SAINT-SAVIN-SUR-GARTEMPE

Style: Romanesque

Dates: Circa 1060–1115

Architect: Unknown

The “Bible of Saint-Savin”

The church of Saint-Savin-sur-Gartempe is the most complete synthesis of Romanesque architecture, sculpture, and painting in France. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) has made it a World Heritage Site. The church of St. Savin, once part of a large, powerful abbey, is also a superb example of architecture in the Poitevin, the region around the city of Poitiers in western France. It was built at the same time as the great abbey of Cluny III in France and Durham Cathedral in England, and is comparable in the quality of its architectural space to both. Like

many Poitevin churches, St. Savin has a long, high central *nave* flanked by side *aisles* nearly as tall. The glory of St. Savin is its frescoes, known as the “Bible of St. Savin.” Scenes from the Old Testament covering the nave’s *barrel vault* are supplemented by others in the porch of the church and in its crypt. Spreading over more than 4,000 square feet, they are among the finest frescoes that survive from the Middle Ages and are certainly the most extensive in France. Originally, the *transept*, *choir* and the chapels radiating from it were also covered with frescoes, but those have disappeared.

The Origins of the Abbey

According to church legend, toward the mid-fifth century, two Christians, the brothers Savin and Cyprien, were condemned to death in Macedonia for refusing to worship pagan idols. They escaped to Gaul (modern France), but were followed and found by their executioners. Savin was decapitated on the banks of the Gartempe and buried on the “Hill of the Three Cypresses” near the present city that bears his name. An abbey was built near his grave in the ninth century, but it was pillaged by the Normans in 878, and not rebuilt until the eleventh century.

The lower part of the tower, the oldest existing part of the church, was finished at least by 1060, six years before William the Conqueror conquered England. Instead of there being a pair of towers flanking the entry, the single tower was built over the entry, on axis with the nave of the church. The *apse*, *ambulatory*, *radiating chapels*, and the transept of the abbey church were built next, that is, from 1060 to 1075. The nave, which originally had a wood roof, was extended to connect the transept with the entry tower during the next ten years. Around 1095, the nave was partially demolished to construct the present stone barrel vaults. By 1115, the five existing eastern bays of the nave were finished. The slender spire on top of the entry tower, 312 feet high, is the most recent part of the church. It is *Gothic*, not *Romanesque*, and contrasts, therefore, not only in style, but in its verticality to the long, horizontal nave.

The abbey remained prosperous until the Hundred Years War, but when it ended in 1453, the abbey became a pawn in violent battles between the soldiers of the king of France and the Black Prince (Edward of Woodstock, Prince d’Aquitaine). It continued to be fought over by the Catholics and Huguenots during the Wars of Religion, and was devastated between 1562 and 1568 by the Calvinists, who burned the choir stalls, the organ, and the roof trusses. From this point, because of lack of funds for maintenance, many of the abbey buildings fell into disrepair and were demolished in stages. From 1611 to 1635, a curious man who called himself the Baron des Francs used the church as a fortress. In 1640, the abbey was taken over by the congregation of Saint-Maur and returned to its religious function. Given this history, it is surprising that so many of the frescoes survive and that the church itself is in such good condition. In 1836, Prosper Mérimée, the French in-



Saint-Savin-sur-Gartempe is an example of the experimentation with architectural forms that occurred in the eleventh century. Because of its synthesis of architecture, sculpture, and painting, UNESCO has made it a World Heritage Site.

spector of historical monuments (and author of *Carmen*, see **Vézelay**) started restoration of the church and its frescoes.

St. Savin as an Example of the Poitevin Style of Romanesque Architecture

Even though it was not located in or near Poitiers, the cosmopolitan capital city of the region, St. Savin is one of the earliest and most admired examples of the Poitevin Romanesque style, one of the most important Medieval schools of architecture. Poitiers had been an important Roman city, larger and more sophisticated than Paris. As every French schoolchild knows, Charles Martel had stopped the advance of the Saracen army north of Poitiers in 732 c.e., keeping France from becoming a Muslim country like Spain. During the Romanesque period, the court in Poitiers was among the most brilliant in France, the source of some of the most imaginative art, music, and architecture of the eleventh and twelfth centuries. Because the shrine of its Early Christian bishop St. Hilary was an important stop on the pilgrimage route from Paris to Santiago de Compostela, innovations and motifs introduced in and around Poitiers were carried both north and south, to southwestern France and northern Spain and to Paris. Innovations flowed in the opposite directions, too. Poitiers was, therefore, anything but a provincial capital when St. Savin was designed and built, and its wealth and culture are major reasons it was built and decorated so well and relatively rapidly (1060–1115).

Another reason for both the quality and speed of construction and for the high quality of the innovative architecture is the excellent quality of the local limestone and the masons who used it. Poitevin limestone is white, but when exposed to the air, it gradually takes on warm buff and grey tones. It is structurally strong but can be shaped relatively easily, stimulating masons to high levels of craftsmanship and innovative solutions for vaulting, which they continued to refine even when architects and masons in northern France were experimenting with the rib-and-panel vaulting that led to the Gothic style (see **Saint Denis**). The light, warm color of the weathered stone made simple, subtly lit forms effective. While elsewhere in France architects developed dramatic interiors with tall, directly lit central spaces and low side aisles and galleries, the Poitevin architects' main concern was with clear interior space illuminated indirectly by high windows. Side aisles, though narrower, are almost as tall as the nave, giving the impression of a simple large hall, thus the common descriptive term "hall church" for them. The characteristic Poitevin church has no windows in the walls of the central nave. Instead, as in St. Savin, there are windows high in the walls of the side aisles (*clerestory windows*), a variation on schemes used by the ancient Romans and revived in Catalan churches before the year 1000. The tunnel vault and high side aisles with clerestory windows results in the even and soft diffusion of light through the church and gives it a sense of peaceful, meditative shelter. While less dramatic than some contemporary churches, such as **Saint Sernin**

in Toulouse, St. Sernin's simple beauty is as effective. Another advantage of the Poitevin type is that it simplifies structural problems. Instead of requiring the addition of elaborate buttresses, as is the case in many other Romanesque churches, the vaults of the side aisles absorb the lateral thrusts of the central vault. The shape is structural; it does not need additional supports.

St. Savin, while not immense, is large: the nave is 250 feet long, proportionately narrower and taller than other churches in the region, and the cylindrical columns supporting its vault comparatively slenderer. It is a particularly elegant example of the Poitevin style. The light in the church, which is reflected from, and diffused by, the columns, the floor, and the walls onto the vault is much more even and luminous than that in other contemporary churches, even those around Poitiers. This unique light is especially important in St. Savin; it is essential to seeing the frescoes, which would be in shadow if St. Savin had been lit like most other churches.

The Relation of the Decorations to the Architecture

The sequence of spaces in St. Savin is also special and enhances the experience of the frescoes. Instead of stepping up into the church from the porch, as is typical of most churches, at St. Savin, one descends a set of stairs from the entry into the porch, then down more steps into the nave. The first three (western) bays of the nave were the first to be vaulted, and ribs cross the vault from side to side in line with the columns. The vault, thus the frescoes, is divided into three separate panels. The absence of ribs across the rest of the nave vault creates a smooth tunnel-shaped ceiling surface. Most of the scenes in this section of the nave are divided one from another by their compositions rather than by architectural features. The column capitals in this part of the church are decorated with foliage similar to that on Roman *Corinthian columns*, another influence from the Roman past of the region. Unlike the Roman precedents, however, and more typical of Romanesque architecture, animals such as lions occasionally appear on the column capitals in St. Savin.

Decorations, whether sculpted, painted, or woven, were more than just embellishments. Images were essential to the illiterate general population in the Middle Ages, who had no access to a Bible unless it was read to them or they could see its stories in images. All Medieval churches had such scenes painted, sculpted, and later included in stained-glass windows to instruct; images were consequently carefully chosen by the church.

The Content and Character of the Frescoes

Painted images dominate the interior of St. Savin more than in most churches. Since few other Medieval churches retain as much of their original painting as St. Savin, this may, however, be somewhat misleading. St. Savin seems to have been conceived as, or at least it became, a "canvas" for the frescoes. Most of them are contemporary with the more famous Bayeux

tapestry, the embroidery that documents William the Conqueror's conquest of England, and the two cycles of images are stylistically quite similar.

The frescoes in St. Savin are not painted on canvas, neither are they "true" frescoes. In true fresco, as in Michelangelo's Sistine Chapel ceiling, the artist paints on fresh plaster. Consequently, the colors penetrate into the plaster and chemically bond with it. But the artists in St. Savin painted on dry plaster; the colors therefore remained on its surface. While generally this technique is less permanent than true fresco, it can allow the artists somewhat more freedom of expression. In any case, the St. Savin paintings are characterized by much of the freshness and character that one associates with drawing rather than with painting. The artists used a very limited number of colors: yellow ocher, red ocher, and green, mixed with black and white. In addition, they tended to outline figures with dark lines (as in a comic strip) on an off-white background. The result of these approaches is a simplicity and clarity of both colors and composition that complements the directness of the draftsmanship. The effect is not only clarity, but also great softness and warmth. Some of the original frescoes were destroyed during the years of devastation; others were damaged when they were white-washed after the Benedictines took over the abbey. Still others were damaged during the first phases of restoration. Nevertheless, most of those covering the vault of the nave, in the porch, and in the crypt survive in remarkably good condition.

The scenes in the porch (or *narthex*) represent episodes from the Apocalypse: Christ in glory in the heavenly Jerusalem, the combat between the Archangel and the Beast, and the New Jerusalem. In the vault of the nave, the subjects are from the Old Testament, from Genesis and Exodus rather than Revelations. Figures in the nave frescoes are larger than those in the porch, necessary since the nave vault is so much higher (more than 50 feet) than the ceiling of the porch. The composition of the scenes is closely related to the architecture. In the first three bays, scenes are related to the transverse arches that separate the scenes. In the section of the nave undivided by arches, the scenes are arranged in two continuous strips, much like a comic strip, on either side of a line down the center of the vault. The series begins with the Creation on the north side of the nave, and continues toward the crossing with scenes of Cain and Abel and of Noah, then turns back toward the facade with building the tower of Babel, the lives of Abraham, and finally Moses receiving the Ten Commandments. There were further scenes from the New Testament in the transept and the ambulatory and a fresco of Christ in Majesty in the choir, but these have disappeared. The beige and pink marbling painted on the surface of the cylindrical columns that support the central vault is a sensitive complement to the frescoes.

The elegant simplicity and luminosity of the interior of St. Savin, the emphasis on simple geometric form, and the abstract clarity of the frescoes make it one of the most timeless of Medieval buildings. It could almost be a work

by the great Modern architect Le Corbusier (see **Villa Savoye** and **Ronchamp**, also by Le Corbusier).

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SAINT SERNIN, TOULOUSE

Style: Romanesque

Dates: 1070s or 1080s; restored 1855 and 1993

Architect: Unknown

St. Sernin at Toulouse is the largest of the French churches built during the eleventh and twelfth centuries along the routes that pilgrims followed to visit the tomb of St. James at Santiago de Compostela in northwestern Spain. It is the most characteristic of the pilgrimage church type and the largest French *Romanesque* church still standing. (Cluny III was much larger, but it was demolished in the early 1800s.) Pilgrimage churches were erected during the exceptionally creative period of Medieval architecture after the year 1000, when European culture flowered, in part because of the pilgrimage phenomenon. Like modern tourists, pilgrims stimulated local economies by renting rooms and buying food, drink, trinkets, and souvenirs. They contributed money and jewels that made possible the extensive rebuilding and decorating of churches in places where they stayed, and they helped spread technological knowledge along the routes. Not incidentally, the great crowds of pilgrims that needed to be accommodated were the stimulus for the dramatic increase in the size of churches during this period.

The Plan of the Typical Pilgrimage Church

All four of the largest French pilgrimage churches—Saint Martial in Limoges, St. Martin in Tours, Sainte Foy in Conques, and St. Sernin in



Saint Sernin at Toulouse (end of the eleventh century), a masterpiece of French Romanesque architecture, is the largest of the French churches built along the pilgrimage routes to Santiago da Compostela.

Toulouse—and many of the smaller pilgrimage churches had the same general features, most of which had been introduced in St. Martin at Tours. (Both St. Martin and St. Martial were demolished after the French Revolution, making St. Sernin all the more important an example of the pilgrimage church.) Many of these features were a direct result of having to accommodate pilgrims as well as smaller, local groups of worshippers. The central *nave*, for example, had to be large enough both for hundreds of pilgrims to worship during Mass and also for many of them to sleep in during the height of the pilgrimage season. For the pilgrims to visit in an orderly fashion, the relics that had attracted them even while sacred services were being conducted, were placed in small chapels that could be entered from a continuous walkway (*ambulatory*) around the church. (Relics are objects ven-

erated because of a connection to a saint or martyr, frequently part of the saint's body.) The ambulatory began in the outer aisles that flanked both sides of the nave. It continued past the *transepts* (the shorter arms of the *Latin cross* plan), alongside the *choir* (the head of the cross), and around the semicircular end (*apse*) of the church that contained the high altar. Chapels could project from the ambulatory anywhere along its length, but most generally, as at St. Sernin, they projected from the corridor around the apse in a radiating pattern whose center was, symbolically, the high altar. Above the side aisles of the nave were galleries that accommodated overflow crowds, but also supported the outward thrust of the great stone vaults (*barrel or tunnel vaults*) over the nave and choir that had replaced wood ceilings. Besides making the church more fire resistant and amplifying the chanting that accompanied services, the structural characteristics of the vault influenced many details of the church. (See **Vézelay** for more on vaulting and the problems of fire in Medieval churches.)

Saint Sernin and the First Church Dedicated to Him

About 250 C.E., Sernin (Saturninus in Latin), the first bishop of Toulouse, condemned to death for refusing to sacrifice to the pagan Roman gods, was tied to a bull, and dragged to death. His grave attracted many pilgrims, especially after 380 C.E., when the Roman emperor Theodosius established Christianity in the Empire. A series of churches was built above the grave, but eventually, the crowds became so large that Bishop Sylve put the saint's remains into a marble sarcophagus and, according to tradition, moved them a few hundred yards down the Roman road to a site where a much larger church could be built.

The First Church

Only parts of the foundations of Bishop Sylve's church remain (under the apse of the present church), but they indicate that it, like many other churches of this period, was composed of two separate parts: a round structure, called a martyrium, for St. Sernin's tomb; and a large, rectangular room for sacred services. Pilgrimages—rare in late Roman times—gradually declined, and the church fell into disrepair and burned. By the second half of the eleventh century, however, a small, rebuilt church had become a stop on one of the pilgrimage routes to Compostela. Monks from the monastery that had developed to the north of the church received the pilgrims, who gradually made the monastery and chapter wealthy enough to build a splendid new church.

General Characteristics of the New Church

Construction began between 1070 and 1080, probably in 1077. The architect, whose name has been lost, followed the example of St. Martin at Tours by combining worship space and martyrium into a single, large building. In 1082 or 1083, as the result of a bitter conflict between St. Sernin's

canons (clergy responsible for construction and maintenance of the church) and the bishop of Toulouse, the bishop replaced them with monks from the abbey in Moissac, a daughter house of Cluny. Although the pope reversed the bishop's decision the next year, it had caused a break in construction, and the high altar was not consecrated until May 23, 1096 by Pope Urban II (who had been a monk at Cluny). When Raymond Gayrard (Raimond Gairard) took over as site foreman—and probably architect—about 1098, the east end (choir, apse, ambulatory, and *radiating chapels*) must have been finished and the transepts nearly complete. He began construction of the nave, and by his death in 1118, most of the exterior walls, up to the windows in the galleries, and most of the nave *piers* had been built, but only the three *bays* of the nave nearest the crossing and part of the side aisles had been vaulted. Construction continued slowly until the seventeenth century, closely following Gayrard's design, even though architectural styles had changed. Though St. Sernin appears to have been built quickly in a unified style, in fact, it took several centuries to build. The west front was never finished.

The Interior

Almost 360 feet long (the length of a large city block), 68 feet high, and 104 feet wide (including the side aisles), St. Sernin is Romanesque architecture at its purest and grandest. In elevation (viewed head-on), the sides of the nave resemble ancient Roman buildings like the amphitheater at **Nîmes** (thus the term Romanesque). On the ground floor, for example, arches spring from rectangular projections on the sides of the thick rectangular piers that support the nave vault and connect them. Semicircular columns attached to their fronts (nave sides) rise the full height of the piers. St. Sernin is less decorated than most Romanesque churches. Unlike Vézelay, for example, there are no richly carved *capitals*, sculptures, or frescoes in the nave. From the tops of the thin columns attached to the nave piers, which rise without intermediate moldings from the floor to their capitals, flat masonry bands (*doubleaux*) curve in a semicircle along the underside of the vault. Structurally the doubleaux strengthen the barrel vault; visually, because they connect pairs of columns across the nave, they define each bay.

Since there are windows only in the outer walls of the galleries and the lower side aisles of the nave, light enters the nave indirectly and is further diffused by the curves of the vaulting. It reflects off both piers and walls, whose mixture of yellow-ochre stone and pinkish brick give to the light a soft, warm, golden glow. By contrast, there are windows in the end walls of the transepts and high in the walls of the apse that let light directly into these parts of the church. The east end, especially the area around the altar, the most sacred space in the church, is consequently the brightest part of the church. When the tower over the crossing, where nave, transepts, and choir intersect, was made higher in the thirteenth century, the four crossing pillars had to be enlarged to support it, narrowing the view from the nave to the choir and high altar. Although this frames the choir, making it seem like

a sacred stage, historians such as Kenneth John Conant believe that the narrowing “strangles” the church.

In 1258, St. Sernin’s remains were moved into a sarcophagus that was incorporated into a new high altar. His remains had originally been in the crypt, which is half a floor below the nave and a full level below the choir, which is elevated a half level above the nave. Among the relics now in the crypt are most of the remains of St. Thomas Aquinas, which were moved there after the French Revolution (his head is in the Holy Spirit chapel behind the high altar). From 1718 to 1759, the canons had a Baroque *baldachino* built over the high altar. Though a masterpiece in its own right, it seems out of place in St. Sernin.

The Exterior of St. Sernin

Every part of St. Sernin’s plan is clearly expressed on the exterior. Each chapel projects as a discrete unit from the wall of the ambulatory, a smooth brick ring with a sloping roof. Rising out of the middle of this ambulatory ring is the upper wall of the apse, a half-cylinder capped by a semidome and punctuated by an arcade of round-headed windows. These parts compose a pyramid that builds up to the crossing spire. St. Sernin’s exterior, like its interior, is a mixture of brick and stone. Window frames, the columns between windows (which correspond to the doubleaux and piers that support the nave vault), *cornices*, and other parts of the building that need to be especially resistant to the structural forces in the building are made of a creamy light tan stone; the walls between are built of reddish-orange brick. Not only is this variation of materials attractive, but it also helps to differentiate the units that make up the church. Structural and nonstructural elements are more consistently represented in the east end than in the transepts, the upper parts of which look as if they were added later. They have recently (1991–1993) been returned to their appearance in photographs taken before Viollet-le-Duc’s restoration in 1860–1879, but this reversal is as controversial as the earlier “restoration.”

The 211-foot-high tower over the crossing looks a like a brick pagoda, with five octagonal, arcaded levels, each of which is set back a bit from the one below it. A sharply pointed spire rises behind a balustrade on the top story. Openings in the bottom three stories are Romanesque, thus round-headed; but openings in the top two stories are Gothic, triangular-headed openings added later (before 1283). It was the heightening of the tower that occasioned strengthening the crossing piers. Despite the mixture of styles, the tower is quite handsome and was widely imitated in the region.

In large French Medieval churches, the public typically enters through doors in the west facade, which consequently tends to be the most richly decorated part of the church. St. Sernin’s west facade, however, is plain to the point of ugly. Mostly, it is a sheer, poorly proportioned cliff of brick with few windows and a little carved stone decoration low on the facade. It was probably left unfinished in 1118, when work on the whole church was halted, and

most of the minimal decoration that was added later was removed in the late eighteenth and early nineteenth centuries for reasons that are still not apparent. Not even the stubs of the pair of towers planned for the facade were built, and the north side of the facade was brought up to match the south side only from 1927 to 1929. Before he died, Raimond Gairard finished the double central door. This, too, is unusual; Medieval churches usually had one, three, or even five doors.

Most people enter by a door in the south transept. It is framed by a surviving gate from the walls of the ancient Roman city of Toulouse. (Bishop Sylve's church was built just outside the ancient city walls.) Above the door is a superb Romanesque relief sculpture, one of the earliest examples of the St. Sernin "school" of sculpture. Figures in this relief, simplified and abstracted, have a serene beauty and linear grace that indicate influence from the Eastern Roman Empire, specifically Syria.

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THÉÂTRE DES CHAMPS-ÉLYSÉES, PARIS

Styles: Modern/Early Art Deco

Dates: 1911–1913

Architects: Auguste Perret (1874–1954) and Gustave (1876–1952) Perret; based on schemes by Roger Bouvard (1875–1961) and Henry van de Velde (1863–1957)

Both in form and structure, the Théâtre des Champs-Élysées is a key monument in the development of Modern architecture. It was a major influence on the development of the Art Deco style, and it was the first large civic

building to be constructed of reinforced concrete. It was also the location of the famous riot at the premiere of Stravinsky's *Rite of Spring*.

Who Designed It?

Gabriel Astruc, an impresario and director of a group called the Société Musicale, proposed a theater with three auditoria for avant-garde music and dance in the west of Paris: a 2,000-seat concert hall, a 1,200-seat theater (*La Comédie*) and an 800-seat playhouse (*Le Studio*). He had wanted to build on the Champs-Élysées, Paris's "main street," and had a scheme drawn up by a Swiss architect, Henri Fivaz (1856–1933), but the city proposed a less-prominent site on the Avenue Montaigne, a broad street leading up to the Champs-Élysées from the Seine River. Roger Bouvard (1875–1961) took over from Fivaz and prepared a preliminary design in 1910–1911. He, in turn, was replaced by Henry van de Velde, who was, at the time, director of the Weimar school that became the Bauhaus. The painter Maurice Denis recommended him. Though not trained as an architect, van de Velde had designed numerous buildings, none of them as large or complex as this theater. He prepared detailed plans and the first design for the facade.

Astruc had envisioned a metal structure, but it became clear as the project evolved that a structure in reinforced concrete, a relatively new building material at the time, would be more economical and more fire resistant. Van de Velde brought in as consultants the Perret brothers, the unrivaled experts in reinforced concrete construction. They proposed considerable modifications to van de Velde's project, essentially taking it over, and he resigned as architect in July 1911. The Théâtre des Champs-Élysées was inaugurated on March 31, 1913, with Berlioz's opera *Benvenuto Cellini*.

These are the bare facts on which all can agree, but van de Velde, the Perrets, and their supporters have quarreled bitterly ever since over who should get primary credit for designing the building. In effect, the plan and facade are essentially van de Velde's, but the structure of the building is so complex, so unprecedented, and it affected the development of the building to such an extent that the final building is at least as much the Perrets's.

The Architect-Engineer

Many in France consider Auguste Perret to be the "father of modern French architecture." Even the most famous French (actually Swiss) architect of the twentieth century, Le Corbusier, credits working in Perret's office with changing his life. Auguste, with his brothers Gustave and Claude, developed the system of reinforced concrete that is most used today. They had started with systems invented by François Hennebique (1842–1921) and Anatole de Baudot (1834–1915) and had made both more efficient and more adaptable to broad use. Their apartment building at 25 bis rue Franklin in Paris (1903) is usually considered the very first reinforced-concrete building to exploit and express the possibilities of a reinforced-concrete skeleton. Al-



An early example of reinforced concrete architecture, the Théâtre des Champs-Élysées in Paris (1911–1913) is also an early example of what became known as the Art Deco style.

though Auguste is frequently represented in histories of architecture as an engineer and contractor, not an architect, in fact, he was a very talented architect and had nearly received his diploma at the École des Beaux Arts, the French school of architecture. He refused to qualify for the diploma because if he had received it, French law would have prevented him from also working as a building contractor.

A Complex Building: Perret's Structural Rationalism

Two things made the Théâtre des Champs-Élysées so complicated: its site is long and narrow, and each of the three theaters in the building needed a separate entrance, a separate lobby, and separate support spaces. The Perret's solution was a single, reinforced-concrete skeleton into which the three

theaters and their related functions interlocked. Their structural frame is extraordinary even by today's standards, a work of art in and of itself and an important influence on Modern architecture. A pair of bow-string *trusses* (so-called because they resemble a bow—but without an arrow) sit on four pairs of concrete piers. The piers, visible as exposed structure in the theater lobbies and expressed on the facade, imply a geometric grid that is carried throughout the building. Like Viollet-le-Duc, the great theorist whom he admired, Perret believed that the structure of a building should be visible and determine the form of a building. Where he and Viollet differed was in the formal principles on which each based his designs. For Viollet, they were derived from Medieval architecture, for Perret from classicism, especially from the buildings of François Mansart (see the entry for **Maisons**).

Perret's Classicism

Perret's classicism is evident in the facade. Though he does not use classical details—there are no column capitals and no moldings derived from the ancient buildings—his use of repeated regular proportions (interlocking squares of various sizes); the symmetry and regularity; and the subdivision of the facade into base, body, and top is common to classicist buildings. Perret uses little ornament or decoration, but he did incorporate three very large sculptural reliefs by Antoine Bourdelle at the top of the facade depicting *The Muses Running to Apollo* and *Apollo at his Meditation*. More of Bourdelle's friezes are above the entry doors. In all cases, the reliefs are set behind the structural elements.

In the main auditorium, structural elements include sinuously curved balconies that show the suppleness of reinforced concrete and its ability to project (*cantilever*) from walls without support of columns. Perret (and his client) believed not only in a close relation between structure and form, but also in the contemporary desire to combine music, theater, painting, sculpture, and architecture as a total work of art, the idea of *Gesamtkunstwerk* put forward by the composer Richard Wagner. Maurice Denis painted the decorative band around the dome of the auditorium, and his reliefs representing Song and Dance frame the organ above the stage. René Lalique, the glass artist, designed the light fixtures. Other famous artists of the time, including Edouard Vuillard, decorated other parts, including a small studio theater installed in 1923, in what had been a gallery. Along with Bourdelle, these artists created a homogeneous decorative style that always respects Perret's desire to let the structural elements dominate.

At first, Perret's building was denounced by some as a departure from French traditions, and by others as "Hun [German] architecture," when it first opened, a year before the First World War. It was praised and emulated by others because it represented a new direction. The facade, and even more the interior, is stylistically similar to those of many of the pavilions at the 1925 Paris exposition of decorative arts (Exposition Internationale des Arts Décoratifs et Industriels Modernes) that defined the Art Deco style (its name

derived from that of the exposition). The Théâtre des Champs-Élysées is an Art Deco building twelve years before the fact. It was renovated in 1986–1987. A panoramic restaurant added to the roof in 1990 has met with much criticism.

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TUILERIES GARDEN. *See* Louvre and Tuileries Garden.

UNITÉ D'HABITATION (MARSEILLES BLOCK), MARSEILLES

Style: Modern (Brutalist)

Dates: 1945–1952 (inaugurated October 14, 1952)

Architects: Le Corbusier (Charles-Édouard Jeanneret) (1887–1965), with Vladimir Bodiansky (1894–1966)

Le Corbusier was the most influential European architect of the twentieth century. His *Unité d'Habitation* in Marseilles, also called the Marseilles Block, is one of his most important buildings. The first major architectural monument to be built in Europe after the end of the Second World War, it is as representative of the architecture of the 1950s and 1960s as his **Villa Savoye** was of the 1920s. Famous—or notorious—before it was finished, it was copied or emulated—for better or worse—all over the world. Its rough concrete construction initiated a whole new stylistic school of Modern architecture, Brutalism. For all its fame, it still is not universally admired. In Marseilles, it is still popularly referred to as *La Maison du Fada*, the House of the Crazies.



Le Corbusier's Marseilles Block (1945–1952, also called the *Unité d'Habitation*) is the most famous post-World War II apartment building in Europe. It represented a new direction (Brutalism) in the career of one of the most famous Modern architects.

The Commission

Raoul Dautry, the first minister for reconstruction and urbanism, a modernist and longtime friend of Le Corbusier, gave him the commission for the *Unité* in August 1945, his first commission in six years. Dautry also asked proposals from him for rebuilding two cities that had been razed by the Nazis. These schemes were not carried out, but for them, Le Corbusier formulated many of the ideas he used in the *Unité*.

Political instability in postwar France—there were ten different governments during the period the *Unité* was designed and built (1945–1952)—caused many problems for Le Corbusier. Each of the four ministers of reconstruction proposed a different site. The last of them resigned just before construction began in late 1947 on what was then still rough terrain west of the Boulevard Michelet, Marseilles' main north-south axis.

With the Marseilles Block, Le Corbusier finally had the opportunity to test ideas he had been developing for twenty-five years. Except for an apartment house in Geneva and one he owned in Paris, none of the large-scale housing developments he had designed in the 1920s and 1930s were constructed. During the Nazi occupation of France, he had worked on mass housing schemes to be built after the war. With little chance to build large apartment buildings, he had used commissions for houses and townhouses to

develop prototypes for units that could be mass produced and assembled into large-scale housing units.

“Bottles in a Wine Rack”

Central to these schemes was a structural skeleton into which these mass-produced housing units could be inserted, Le Corbusier said, like bottles in a wine rack; bottles that could contain either champagne or table wine. The Marseilles Block's 18-story “wine rack” was designed to contain 337 “bottles” of 23 different types, ranging from simple, one-person apartments to large suites for families with 8 children.

Initially, Le Corbusier wanted to use steel for the structural skeleton, much as he had in the Swiss dormitories of 1933 for the University City in Paris, but steel was expensive and in short supply in postwar France. Instead, he refashioned his design to use reinforced concrete, which was cheaper and more available. In doing so, he changed his approach to architecture, or at least to the appearance of his buildings. Replacing the taut, massless surfaces that gave his prewar work a machine-age, industrialized image were rough concrete surfaces that bore the marks of crudely built wooden forms that contained the raw concrete—*béton brut*—until it set. Critics soon referred to this new approach as “brutalist,” a term that combined two senses of the French word *brut*: raw or unfinished and crude.

Not everyone saw this designation as pejorative, and Brutalism was quickly adopted by avant-garde architects all over the world. In reality, Brutalism resulted not from a conscious attempt at a new style, but from Le Corbusier's brilliantly having made a virtue out of limitations. Every knot in the cheap, rough lumber that was available for the forms as well as the grain in the wood showed in the surface of the cured concrete like fossils in limestone. Le Corbusier defended this as humane: The imperfections in the concrete building were like the wrinkles and blemishes in human skins. Since the edges and joints of boards used in the formwork, which was built by the mostly untrained laborers, were also part of the surface texture, the design of the forms became as significant as masonry joints had previously been.

The Exterior

The *Unité d'Habitation* is a rectangular block, 449 feet long, 80 feet wide, and 183 feet high, that sits on pairs of concrete piers that look to many like massive thighs. An abstract relief of a man with his legs spread apart and his arm in the air reinforces this analogy. Molded into the base of the building, this relief of “the Modular Man,” Le Corbusier's version of Leonardo da Vinci's Vitruvian Man, is accompanied by geometric diagrams meant to explain a system of proportions based on both the metric and English systems of measurements that Le Corbusier had developed and used throughout the *Unité* and his other postwar buildings. (It was not always rigorously applied; Le Corbusier told his staff not to use it when it caused too many complications.)

Le Corbusier created a sculptural facade with deep shadows by placing a concrete frame in front of the window surfaces that, while decorative, was primarily intended to shade windows during the summer while allowing sun to penetrate into living spaces for a minimum of two hours per day in the winter. He had experimented with this feature, which he called a *brise-soleil*, on a building in Rio de Janeiro in 1936, but the site for the Marseilles block presented difficulties. Protection from the mistral, the powerful regional north wind, was as important as shading from the sun. Orientation of the building to minimize the effects of the mistral made the sun shading less effective. As a result, apartments on the west get sun from 3:00 to 5:00 PM on summer afternoons—the worst possible time—and for only twenty minutes in the winter; south-facing apartments get sun all year. Besides, Le Corbusier used the same *brise-soleil* on all sides of the building, regardless of sun exposure, so it would appear that the ideal was more important to Le Corbusier than the practical.

The Interior: Apartments

Apartments are narrow, only 12 feet wide, but most extend all the way through the building, allowing for cross-ventilation, and one end of most is a spacious 15 ½-foot-high, two-story living room, whose entire width is a balcony within the *brise-soleil*. Since the opposite end has only a single story, by stacking the one-story end of an apartment above the two-story end of the one below, Le Corbusier needed to put corridors only on every third floor, that is on floors 2, 5, 7, 8, 10, 13, and 16. (Floors 7 and 8 house services for the whole building.) Front doors on one side of the corridor open onto the lower floor of one apartment and onto the upper floor of the duplex apartments on the other side. This complicated arrangement contributed to the high cost of construction, and has two other drawbacks. First, the two (children's) bedrooms on the one-story end of the apartment, which are created by a partition that divided the apartment lengthwise, are barely 6 feet wide, only enough for a single bed. Near the window, the partition can be slid aside to create a larger play space, but this compromises privacy. Second, hallways, which extend the entire length of the building—longer than the average city block—seem interminable.

Charlotte Perriand designed the kitchens at the center of each apartment, their symbolic heart, as well as most of the furnishings. Depending on the type of the interlocking apartments, the kitchen is either under the balcony (parents' bedroom) overlooking the living-dining room, or (less conveniently) it is on a balcony at entry level. To provide acoustic isolation for apartments, Le Corbusier designed them to be built on a subframe of metal joists that rest on lead pads, and the walls between them are filled with mineral wool. Apartments are very quiet.

Le Corbusier wanted the *Unité* to be as self-sufficient as possible and included numerous communal facilities to serve the building's 1,600 inhabitants. There are a twenty-four-room hotel, a restaurant, bar, shops, baker,

butcher, barber-beautician, sauna, and commercial offices on the “main street,” halfway up the building (floors 7 and 8). A gymnasium, nursery school, swimming pool, and a running track are located on the roof. They, combined with a variety of other sculptural elements—smokestacks, stairs, free-form sculptures—turn the roof into a mini-city much (coincidentally, no doubt) as at **Chambord** more than 400 years earlier. As several critics have noted, with the roof deck and its smokestacks, the intermediate promenade floor, and the overall appearance of a ship’s hull set up on concrete supports, the *Unité* resembles a landlocked steamship. Steamships had long been one of Le Corbusier’s inspirations because of the functional efficiency of every aspect of their design.

Construction and Criticism of the *Unité*

Construction, which started two years after the commission was given, was projected to last only twelve months. It lasted five years because, even though delays had been expected—the *Unité* had been funded as an experimental building—numerous, unexpected problems arose, some of them caused by general inexperience with the concrete construction. Coordinating building contractors had proved difficult. Le Corbusier and Bodiansky, an architect-engineer responsible for technical details, argued. Architects, planners, health officials, and various government entities tried to scuttle the project from the beginning. Early critics decried what they saw as a vertical “slum.” When the first apartments were finished, the same critics condemned them as apartments for American millionaires. (Marseilles was a communist-controlled city.) Le Corbusier was also thwarted by those who saw him as a collaborator for having tried to work with the Vichy government during the Nazi occupation of France. (He had been appointed to a housing committee at Vichy, but was almost immediately dismissed by the conservative government.)

Plans for more *Unités d'Habitations* in Marseilles came to nothing, but there is one in Nantes, another in Briey-en-Forêt, and there is a low-cost version at Firminy, a city with several buildings by Le Corbusier, one of which, the church, is still under construction forty years later. An *Unité* built in Berlin was compromised during construction. None are as successful as the Marseilles Block. Of the many imitations, few were even marginally successful, making the Marseilles *Unité* all that more of a unique, though flawed, masterpiece.

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VAL-DE-GRÂCE, PARIS

Style: Baroque

Dates: 1643–1669

Architects: François Mansart, Jacques Le Mercier, Pierre Le Muet, and Gabriel Le Duc

The Most “Baroque” of Parisian Monuments

A masterpiece of French religious architecture, with one of the finest domes in Paris, the church of the Val-de-Grâce is the most “Baroque” building in Paris, the most like a Roman High Baroque church. The complex of buildings of which it is part is also important because it has been altered less than other Parisian seventeenth-century building ensembles.

Queen Anne’s Vow to Build the Church and Abbey

Anne of Austria, queen of France, had vowed to build a magnificent church should she give birth to a son. She and King Louis XIII had a childless, twenty-three-year marriage and were estranged, so it was considered something of a miracle when she became pregnant with the son who would become Louis XIV. He was born in 1638. In 1643, Anne asked François Mansart to design the church, a monastery, and living quarters for herself on property she had bought and given to the Benedictine order. Anne gave permission to one of the friends from her youth, Marguerite d’Arbouze, to move her abbey into the new facility. Marguerite had formerly been abbess of Val-de-Grâce-de-Notre-Dame-de-la-Crèche south of Paris, thus the name for the new church and convent. The queen laid its cornerstone in 1624, and often went to the new construction to pray and to plot against the king’s advisor, Cardinal Richelieu (of *Three Musketeers* fame). Discovering this, Louis ordered the abbey to be searched in 1637, the year before his son was born.

François Mansart and His Successors

François Mansart, architect of **Maisons**, a wing of the chateau at Blois, and a scheme for rebuilding the royal palace of the **Louvre**, was considered the most talented architect of the time. Work on the church, whose cornerstone was laid in 1645 by young Louis, proceeded more slowly than the queen had anticipated. Mansart, typical of his practice, kept changing and expanding the scope of his designs. Impatient to see the work complete—she wished to retire to the convent—the queen replaced Mansart the next year with Jacques Le Mercier, the First Architect to the king. He followed



The Val-de-Grâce (1643–1669) is one of the few buildings in Paris than can be called “Baroque.” Begun by the brilliant François Mansart, it was finished by others.

Mansart’s design with only minor modifications up to the beginning of the vaults, but at that point, the Fronde, an insurrection against the boy king and his mother, who was acting as regent, halted construction for seven years (1648–1655). Work resumed in January 1654, but Le Mercier died the same year, and Pierre Le Muet and his assistant, Gabriel Le Duc, took over construction. They changed Mansart’s design above the first floor, modifying de-

tails (the *order* and the second floor of the facade) but more significantly the form and proportions of the dome and its lantern. Rough construction was completed by 1662, but decoration and furnishing continued until 1669, well after Queen Anne's death (in 1666). It was, therefore, Louis XIV's minister, Colbert, who signed the contracts that completed decoration of the church, especially the *baldachino* over the high altar. The church was consecrated only in 1710. After the French Revolution, the abbey became a military hospital (1793) and a medical school (1850). In 1916, a museum was created in part of it.

Exterior

The church at the Val-de-Grâce is placed between the queen's residential wing and the convent. All three parts front on a narrow city street; Mansart set the church back from it and used the other two parts to create a forecourt, closed by a simple grille, in front of the church. Although a side street now permits a distant view of the facade, Mansart intended it to be seen only from the forecourt, and designed the facade to screen the dome so that only the cross at the top of the dome would be visible and would appear to crown the facade. Le Muet's taller dome destroyed that effect.

The Facade and Its Roman Inspiration

The facade of Il Gesù, the mother church of the Jesuit Order in Rome, had become a model for church facades in Paris during the seventeenth century (for example, St-Paul-St-Louis and the church of the Sorbonne), and Mansart's original design was probably based on it, too. These facades have a broad lower floor and a classical, templelike porch, above which is a narrower temple form. Large stone scrolls (volute) create a visual transition between the two stories. Mansart was probably responsible for the powerful contrast between the projecting porch and the recessed central part of the second story, but Le Muet's or Le Duc's modifications made the facade even more dramatic, even more like the High Baroque facades designed by Carlo Maderno for Santa Susanna (the American church) in Rome and St. Peter's. This strong Roman Baroque influence is probably the influence of Gabriel Le Duc, who had returned from Rome shortly before starting work on the Val-de-Grâce.

The Dome Exterior

Next tallest in Paris after the domes of the **Panthéon** and the **Invalides**, that of the Val-de-Grâce is more elaborately decorated than either of them. It, too, resembles Roman Baroque domes, although Bernini, the great Italian architect who visited the Val-de-Grâce in June 1665, thought that Le Muet's dome was poorly proportioned. He thought it looked like a little skullcap on a large head, the result of Le Muet's elongation of the dome.

Many of the details of Le Muet's dome resemble Michelangelo's dome for St. Peter's, which Le Muet would have seen in engravings by a contemporary French architect.

The Dome Interior

Like most earlier domes, Val-de-Grâce's is composed of two domes, an inner stone dome, proportioned to the interior of the church, and an outer, taller wooden dome that gives a more appropriate silhouette from the exterior. (The nearby Panthéon has, uniquely, three superimposed domes, all of stone.) Following Roman practice, the inner dome is covered with a fresco (by the painter Mignard). Perhaps because it so closely resembles frescoes in Roman churches like S. Andrea della Valle or Santa Maria in Valicella, it was one of very few things Bernini admired in Paris. As in these churches, Mignard's fresco is one continuous painting instead of being split by architectural details into separate panels, as in previous domes in Paris. The fresco shows Queen Anne, led by saints Louis and Anne, offering the church to Christ. There are more than 200 figures, three times life size, in the fresco.

The Interior

Mansart's plan was based on a cross, but instead of the nave being the longest arm, it is the arm toward the former convent, the arm to the right of the crossing as one approaches the altar, making Mansart's plan dramatically asymmetrical. The nave was reserved for the faithful in the neighborhood, the right arm for the nuns' choir, which would typically have been the head of the cross, behind the high altar. At the Val-de-Grâce, this space is a circular chapel. The left arm of the cross, opposite the nun's choir, was the queen's oratory. Mansart gave the impression of a unified interior to this asymmetrical plan by carving away the four piers that support the dome at an angle, which emphasizes the crossing and gives the impression of an octagon.

Over the high altar, an elaborate canopy or *baldacchino* was built, neither Le Duc's original design, which Bernini had criticized when he was in Paris in 1665, nor Bernini's, which he prepared for the queen but which, like his proposal for the Louvre, was rejected. It is a new design by Le Duc that looks so much like Bernini's that it was long thought to have been his. Val-de-Grâce's baldacchino has six great columns of black marble with white veins instead of Bernini's four bronze columns, but both sets of twisted columns are covered with bronze leaves and vine.

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VAUX-LE-VICOMTE: CHATEAU, NEAR MELUN

Style: Baroque

Dates: 1655–1661

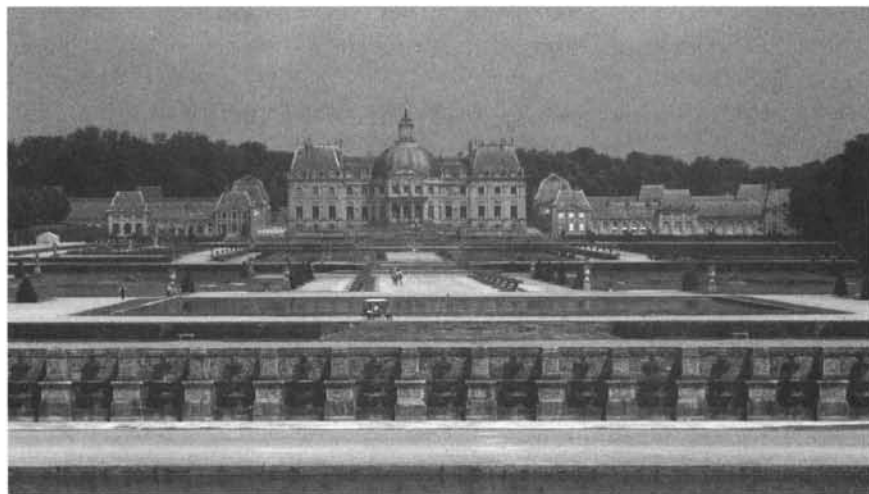
Architects: Louis Le Vau (1612–1670); interior decoration, Charles Le Brun (1619–1690); gardens, André Le Nôtre (1613–1700)

Vaux-le-Vicomte, one of the masterpieces of seventeenth-century French architecture, established a new direction in residential architecture, a new direction in interior design, a new direction in garden design, and a new direction in how a building, including its interiors and gardens, relates to its surroundings. King Louis XIV of France emulated every innovative aspect of Vaux-le-Vicomte when he built the new capital of France at **Versailles**, which then served as a model for many other places, including Washington, D.C.

The Impressively Disastrous Dinner Party for the King

Nicolas Fouquet was ambitious. The name, which he spelled Foucquet, means “squirrel” in the dialect of Anjou, the region from which his family came. The family motto was “quo non ascendet” (to what heights will he not climb), which Fouquet’s rivals interpreted as “to what heights will I not climb.” He was Louis XIV’s finance minister, but he wanted to be named prime minister, and he built Vaux-le-Vicomte in large part to impress the young king with his taste and his abilities, especially as a money manager. Two hamlets and a village were demolished, and the shape of a river valley was changed to provide an appropriate setting for the new *chateau* (manor), whose gardens, at points a quarter of a mile wide, extend almost a mile and a half. They frame views that continue to the horizon in both directions from the main building. As many as 9,000 men worked on the site at one time, and some of the greatest artists of the period were hired to decorate the interior. Fouquet’s ploy to impress the king backfired.

To show off his splendid new estate, Fouquet invited the king and his court to an “entertainment” on the night of August 17, 1661. Louis, who had left Fontainebleau at 3:00 PM, arrived at 6:00 PM. He rested until the heat of the



Nicolas Fouquet did not know that he was creating the inspiration for Versailles when he built Vaux-le-Vicomte (1655–1661), but—after imprisoning Fouquet—Louis XIV hired the same team of architect (Louis Le Vau), interior decorator (Charles Le Brun), and landscape architect (André Le Nôtre) for his new capital. *Photo by Randy Seitsinger.*

day was less, visited the gardens, had a sumptuous meal prepared by the best chef in France (Vatel), and watched a new type of combined ballet and play, *Les Fâcheux*, by Molière. At 1:00 AM, the king and company watched a fireworks display over the canal, and as he returned, a thousand rockets were launched from the dome of the manor, after which he had another meal, and there was more music. Louis returned to Fontainebleau at dawn. He was so impressed that he had Fouquet thrown in prison, where he died almost thirty years later.

Why did the king arrest Fouquet? Was it, as many said, because the king was irritated by a display of wealth (and taste) greater than his, so irritated that only his mother could dissuade him from having Fouquet arrested at the end of the evening? Was it because Fouquet had insulted Louis's mistress? Had Fouquet embezzled money from the king? Or was Fouquet's downfall orchestrated by the clever and unscrupulous Jean-Baptiste Colbert, who also wanted to be Louis's prime minister? It was probably a combination of these.

Fouquet's Background

Nicolas Fouquet (1615–1680) was not an aristocrat. Born into a family of merchants and magistrates, he was well educated, and he married well. His first wife, who had a large dowry, died within a year, and he married an even wealthier woman. Having entered Parliament at the age of twenty and become a brilliant financier, Fouquet bought the office of attorney general and was appointed Superintendent of Finance in 1654. He had gained the king's

appreciation because he had been loyal to and had financed the king during the civil war known as the Fronde, even though the king's enemies were essentially of the same social class as Fouquet.

The Building of Vaux-le-Vicomte

Fouquet began to build at Vaux-le-Vicomte in 1653, on property he had bought in 1642 and gradually enlarged. Louis Le Vau, the architect, and Fouquet signed the contract drawings for Vaux on August 2, 1656. In the same year, Fouquet hired Paul Pellisson, a young lawyer, as his clerk. Pellisson, more than Fouquet, selected most of the gifted artists who worked at Vaux. Le Vau and Le Notre, the landscape architect, were already in the king's employ—Le Vau had been the king's chief architect since 1654—when Fouquet hired them. Charles Le Brun, who was commissioned to decorate the interiors in 1658, was the leading French painter after Poussin (who lived in Rome).

Many changes were made to the chateau during construction. It was originally to have been constructed of brick within a stone framework and have a blue slate roof. By October 1656, Fouquet had decided to build the main house entirely in stone, probably because he considered the brick-and-stone style to be outdated, though the older style was retained for the service buildings. By 1658, the chateau was covered, and by early 1659, the windows were installed. Interior decorations and the landscaping took longer. Between 1659 and 1661, Fouquet gave a number of receptions and entertainments to satisfy the curious.

The New Tradition

Architecturally, Vaux-le-Vicomte represents the transition in French architecture from the military castle of the feudal nobility to the aristocratic residence built strictly for pleasure. In the previous century, one side of the four-square walled compounds of the typical Medieval castle had been replaced by a low wall to create an entry court with low service wings to each side and a residential block at the back (see the entry for **Anet** for more on this). Some features of castles, especially defensive towers, were frequently kept as symbols of aristocracy (as at **Chenonceaux Chateau**). The only Medieval vestige that was retained at Vaux-le-Vicomte was the moat, which became one of the decorative water features.

The Chateau Exteriors

Vaux-le-Vicomte's moat surrounds the platform on which the chateaux was constructed, near the bottom of a hill that slopes down from the north. Broad steps lead up to the chateau, and on the opposite side, an extensive series of terraces and steps descend from it to the extensive gardens that slope gently down to a square reflecting pool, then steeply up to a statue on top of a distant hill.

As a model for the entry side of Vaux, Le Vau almost certainly used

François Mansart's chateau of **Maisons**, which was also built entirely in stone. Le Vau's entry facade is much less refined than Mansart's and violates several rules of strict classicist architecture. For example, Le Vau puts a *pilaster* in the center of the end *pavilions* (projecting sections from the main body of a building), and some of the pilasters extend through more than one floor. The *Doric entablature* of the central, entry pavilion extends across the entire facade, subdividing the floors of the main block and passing behind pilasters. Both of these last two "violations" of classicism visually tie the parts of the building together. They are characteristic of contemporary Baroque architectural practice in Rome.

Le Vau's garden facade is more accomplished. Its central third is an oval bulge, and the end pavilions—there are no intermediate projections as on the entry side—are broader and project less than those on the court side. They are subdivided by the classically correct even number of pilasters. It is almost as if the two sides of the chateau were designed by two different architects, one relatively conservative, the other trying to introduce the latest Italian fashions. A similar dichotomy shows up in the plan: the rooms are not laid out as well on the court side as they are on the garden side. Nevertheless, the plan shows several innovations that will influence later architects.

The Plan

Previous French chateaux (including Maisons) are one-room deep; that is, rooms are lined up in a single sequence from end to end. There may be groups (suites) of rooms only at the ends of the chateaux. Vaux, however, is two-rooms deep on both floors, and some of the rooms break precedence by extending through two stories or more. Vaux's oval salon, the central space of the chateau that causes the bulge in the garden facade, rises from the ground floor into the attic and divides the building into two equal halves. This division was originally more pronounced since the oval salon and the entry vestibule, to which it is connected by three arched openings, was open to the exterior. Later, the three arches containing the entry doors, those between the vestibule and the salon, and the three arches opening onto the garden terrace, all of the same size and aligned with each other, were filled with glass or (on the interior) mirrored doors. Vaux-le-Vicomte's center was originally, therefore, an open-air loggia more typical of Italian villas—as were the multistory rooms. Since the loggia separates the ground floor, there are identical staircases on either side of the vestibule for access to the second floor, which mostly contained bedrooms and private reception rooms, but, directly above the entry, also the chapel.

The Chateau Interiors

Most of the rooms, especially on the garden side, were designed *à l'italienne* (in the prevailing Italian fashions). Traditionally, ceilings of French

rooms had exposed wood beams and joists that frequently were painted with abstract designs. Italian-style rooms were not only larger and extended through more than one floor, they also had smooth, suspended plaster ceilings that typically curved at their outer edges into the walls and were frescoed, at Vaux by Charles Le Brun. Although Le Vau is credited with introducing the Italian style into France, he had never been to Italy, and had only engravings and verbal descriptions to guide him. Le Brun, however, had studied in Italy, so he should probably receive credit for the new approach, which would be developed most spectacularly at Versailles. The suite of rooms that took up most of the ground floor to the left of the entry vestibule at Vaux was reserved for the king, though he never stayed there. Less obvious an innovation, but with great consequences, was the decision to put the kitchens in the basement. By doing so, Le Vau could simplify the overall mass of the building by eliminating the kitchen wing traditionally attached to a chateau.

The Gardens

Le Notre's landscape designs for Vaux-le-Vicomte were even more important than the architecture and interior decoration. Recent scholarship suggests that work on the gardens was begun before he was hired, but there is no doubt that the basic concept is Le Notre's and it is brilliant. Instead of thinking of gardens as something added to a building, Le Notre conceived buildings as "events" in his gardens. At Vaux, before the arches in the center of the chateaux were enclosed, the visitor could have seen through the building to the gardens and sky on the other side. It was as if the chateau was strung like a giant pearl on the central axis along with the rows of trees, gates, stairs, formal gardens, terraces, pools, and statues. It was the whole "necklace," rather than the individual pearls, that was important.

Since trees and shrubs take longer to mature than buildings, some landscaping and gardens were probably started as soon as Fouquet bought the property in 1641. These were most likely well established by 1652 or 1653, when Le Notre arrived at Vaux. (He is first mentioned in documents in 1656, but he was hired earlier. He lived at the chateau until it was confiscated in 1661.) Fouquet gradually enlarged his estate, buying the pond that was transformed into the great canal only in 1656. By 1661, the estate comprised 1,200 acres, mostly meadow and woods. Le Notre used about 170 acres for the gardens. Although large, Vaux-le-Vicomte was smaller than **Chambord** (13,000 acres) and much smaller than Versailles would become (almost 20,000 acres in the grand park).

Le Notre ultimately derived his garden's parts—elaborate parterres (flower beds of intricate designs with walkways between them), fountains, and sculptures—from Renaissance Italian gardens and French versions of them, such as **Villandry**. Instead of juxtaposing these elements as separate compartments in a more or less geometric pattern, Le Notre combined them

in a unified, hierarchical sequence. He conceived his gardens like a cinematographer, as something with a complex theme that develops, with surprising twists and turns along the way, to a climax and denouement. A less-anachronistic parallel, for those who know music, would be to Baroque operas.

The most spectacular event, in part because it is so unexpected, is the canal that one almost literally stumbles onto after walking for about a half mile along the central axis from the chateau. This axis appears to culminate in a statue of Hercules at the top of a hill more than three quarters of a mile from the chateau. Flower beds, topiary shrubs, fountains, statues, and other delights offer attractions to either side of the path, which steps down to a large reflecting pool before rising above a grotto and another pool and fountains to the statue. But the pool is scarcely rounded when an unsuspected sheer drop is encountered. Below it is a canal that stretches a quarter mile to the left, where it terminates in a great round pool, and an equal distance to the right, where it ends in a dam and waterfall. The grotto is not on the other side of the square pool, but more than 600 feet beyond it, on the other side of the canal. The statue, which appeared so close, requires a hike of more than a half mile to reach.

Le Notre used the slope of the ground and manipulated perspective and scale to collapse the visual distance between reflecting pool and grotto and to hide the canal he refashioned in the river valley. Like a master magician, he added distractions along the way to mask the trick. (The technical name for such a landscape feature as the canal, unseen until one is upon it, is a “ha-ha.”) It is little wonder that Le Notre’s gardens are often called “Gardens of Illusion.”

Fouquet’s Downfall and the Fate of Vaux-le-Vicomte

Less than a month separated the great fete that Fouquet gave for the king and his arrest by the musketeer D’Artagnan at Nantes on September 5, 1661. Fouquet had intended, some said, to give Vaux-le-Vicomte to the king as a present once he had been named chief minister, but it was Colbert who was named prime minister to the king. Fouquet’s trial lasted three years, during which time he was locked in the Bastille. He conducted his own defense, nearly losing his life, but writers he had supported, like Jean de La Fontaine, and friends, like Madame de Sévigné, saved his life. Accused of many things, he was convicted of mismanaging the royal treasury. Colbert had arranged the trial and perhaps falsified evidence. At first, the sentence was exile, but the king changed that to life imprisonment without books or other amusements. Whatever else his crimes, Fouquet had attempted to combine the grace and informality of a private celebration with the magnificence of a royal, state celebration. This was *lèse-majesté*, the offense of violating the dignity of the king. It was long thought that Fouquet was the notorious man in the iron mask, but he could not have been.

Vaux after Fouquet

After Fouquet was arrested, the king looked to Vaux as the model for his new capital of Versailles and had its relatively intimate charm magnified into stupefying grandeur. In December 1665, 1,250 trees, especially the orange trees, were taken from Vaux to Versailles. More trees and shrubs followed in 1668. The king also confiscated and occasionally purchased furniture, statues, and 120 tapestries. Ironically, the play-ballet that Fouquet had given was the first of the great entertainments staged at Versailles.

Once most of the things of value, including the designers—Le Brun, Le Vau, and Le Notre—were taken to Versailles, the chateau was, in 1763, returned to Madame Fouquet. She gave it to her son, Louis-Nicolas, who died before her. In 1705, she sold Vaux-le-Vicomte to Field Marshal de Villars. King Louis XV visited in 1731, and was given Fouquet's former apartment, causing confusion of names thereafter. Lawns replaced Le Notre's elaborately patterned parterres when tastes changed. Either the last of the Villars had the lead pipes that supplied water to the fountains dug up and sold to pay debts, or else the Duke de Praslin, who bought Vaux from him in 1764 had this done. In 1783, he had the architect Berthier draw up plans that reconfigured the second floor, largely demolishing Fouquet's apartment.

Vaux after the French Revolution

Vaux barely escaped demolition, the fate of many of the chateaux around Paris. It was the Duke de Praslin's daughter-in-law who successfully pleaded for its survival. For almost a whole century, it was poorly maintained, and it was finally abandoned from about 1857 to 1875, when the industrialist Alfred Sommier bought it and began a campaign of restoration that continues to this day. The chateau is now owned by the decendents of Sommier, who have opened it to the public since 1967 to raise the vast sums of money needed for restoration and maintenance.

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VERSAILLES: CHATEAU, VERSAILLES

Hunting Lodge of Louis XIII

Style: French Renaissance

Dates: 1631–1634

Architect: Philibert Leroy (birth and death dates unknown)

Seventeenth-Century Constructions

Style: French (Classicist) Baroque

Dates: 1661–1735

Architects: Louis Le Vau (1612–1670), François d'Orbay (1634–1697), Jules Hardouin-Mansart (1646–1708), Robert de Cotte (1656–1735); interior decoration, Charles Le Brun (1619–1690)

Eighteenth-Century Constructions

Styles: Rococo and Neoclassical

Dates: 1735–1789

Architect: Angès-Jacques Gabriel (1698–1782)

Although the Chateau of Versailles is not more significant artistically than some other buildings in France, none is more important politically or historically. Along with its complementary garden and new town, the chateau was consciously created to symbolize French power at its height, to be the image of absolute monarchy in the first modern nation-state. Numerous architects, painters, landscape architects, sculptors, and craftsmen worked to create Versailles during more than fifty years of Louis XIV's reign, and the palace was constantly remodeled for an additional fifty. The result—the city plan, the palace, and the gardens of Versailles—was widely imitated by foreign governments, including that of the young United States: Versailles was the model for Washington, D.C.

Versailles was in many ways instrumental in completing the process of centralization begun by the predecessors to King Louis XIV and his chief minister, Colbert. Created partly to create a grand image appropriate to the most powerful monarch in the West and partly to consolidate governmental offices in one place, Versailles was located in the countryside, twelve miles west of Paris, effectively isolating aristocrats so that their every move could be ob-



Versailles became the most powerful city in the West when Louis XIV expanded his father's hunting lodge into the center of government. Later kings added such features as the opera, but the palace was largely complete at Louis' death.

served. The palace was large enough to accommodate much of France's upper nobility (at least 3,000 people lived in the chateau and buildings immediately attached to it), but not all of it. Nobles were consequently forced to compete for the king's favor to get and keep apartments in the palace; the court lifestyle was designed to bankrupt most of them and make them dependent on the king's largesse.

Not incidentally, building Versailles stimulated the French economy. Entire industries were established to construct and furnish the chateau, several of which still prosper. The St. Gobain Glass Company, for example, was created to produce the glass for the hundreds of windows and to invent the unprecedentedly large mirrors for the chateau's most spectacular room, the Hall of Mirrors. St. Gobain, still one of the most innovative glass companies in the world, created the special glass for I. M. Pei's **Louvre** Pyramid in the late twentieth century.

The building of Versailles established a uniform artistic and architectural language for France much as the contemporary French Academy established a uniform French written language. Versailles was, in effect, a school for generations of artists, architects, and craftsmen. In provincial capitals as well as Paris, the new Versailles "style" increasingly displaced regional styles. (For an example, see the entry for the **Grand Theatre of Bordeaux**.)

Chronology of Construction

Work at Versailles started in earnest in 1661, just after a splendid celebration in the king's honor given by Louis XIV's finance minister, Fouquet, at his new estate, **Vaux-le-Vicomte**. Louis imprisoned Fouquet almost im-

mediately thereafter; he suspected that Fouquet had embezzled the money to build his estate, and—even more seriously—he was offended that his minister had a more magnificent and modern chateau than any of the royal palaces. Louis recognized, however, that the team who had designed and furnished Vaux-le-Vicomte—Louis Le Vau, Andre Le Notre, and Charles Le Brun—had created a new French style. He commissioned them to create a considerably larger version of Vaux-le-Vicomte at Versailles, where his father had built a hunting lodge. At first, work was confined to extensive new gardens, which Le Notre designed, and to interior decoration and remodeling of the hunting lodge, but in 1668, after the king's thirtieth birthday, Le Vau, Vaux-le-Vicomte's architect, was asked to transform the hunting lodge into a royal manor. Le Vau died two years later, and his assistant, Francois d'Orbay, continued the work. D'Orbay was replaced by Jules Hardouin-Mansart, who designed the greatest expansion of the chateau, in 1678. In that year, a treaty establishing France as the greatest European power may have convinced Louis to create the new capital to reflect France's (and his) new eminence. The French government moved from Paris to the new capital at Versailles in 1682, a move directed ironically by Colbert, who died the next year. It was Colbert who had ordered the rebuilding of the Louvre in a futile attempt to keep Louis and the government in Paris.

Charles Le Brun and his team of artists and craftsmen had created most of the magnificent interiors of the state apartments by the time the government officially moved to Versailles. Under Louvois, Colbert's successor, continual war prevented extensive new construction. For example, war delayed construction of the palace chapel, which Hardouin-Mansart had designed, and it was so long delayed that it was finished by Robert de Cotte only in 1710, five years before Louis XIV's death.

During the reigns of Louis XV and Louis XVI, the exquisite Petit Trianon and the picturesque Hamlet, both built in the gardens, were the most important architectural additions, although the royal apartments in the palace were extensively rebuilt and redecorated. Ange-Jacques Gabriel's superb Opera House, constructed at the north end of the palace in 1763, was the last major part of the palace to be added. Plans by the same architect, proposed in the 1770s and 1780s, to rebuild the city side of the palace in stone, were only partly carried out. By this time, a series of natural disasters and poor financial management, exaggerated by having financed a large part of the American Revolution, had emptied the royal treasury.

A Palace Wrapped Around a Hunting Lodge

Louis XIV's chateau retains, at its core, the hunting lodge that Louis XIII had built from 1631 to 1634. Its "playing-card" style—the red brick, white stone trim, and blue-gray slate roofs of the exterior were the colors used in decks of cards at the time—had been introduced more than a century earlier and was out of fashion by then, Le Vau and Fouquet having rejected it at

Vaux-le-Vicomte in favor of a newer, stone “Italian” style. Nevertheless, in the 1668 expansion of the hunting lodge, Le Vau retained the “playing-card” style for the entry court facade (the east or city side) of the expanded lodge but used the new, all-stone, Italian style for a new facade he wrapped around its remaining three sides. Perhaps Louis wanted the new entry court, called the Marble Court because of its marble paving, to be an homage to his father. (Two government office buildings, added to the rear hunting lodge facade to create a forecourt, were also designed with the “playing-card” style.) Retention of the Louis XIII hunting lodge partly explains why the expanded building has always been called a “chateau,” that is, a manor house, rather than a “palace.”

A Prodigious Undertaking

Louis XIII’s hunting lodge had been built on a small hill overlooking marshes and woods that were full of wild game. Members of Louis XIV’s court complained that the site had few other attractions and no good supply of fresh water. Louis seems to have seen these shortcomings as challenges; he had the entire landscape refashioned at tremendous expense. As many as 35,000 men worked on Versailles at one time, moving other hills with shovels and wheelbarrows to extend the original hill into a ridge for the expanded chateau; draining the swamps to create a lake and a canal; building aqueducts to supply water for the fountains in the gardens (though never enough); and moving whole forests into the gardens.

The Approach to the Chateau

The Avenue de Paris, the 300-foot-wide axial approach to the palace, was artfully designed to create an overwhelming feeling of awe. Trees line both sides along most of its length, but the trees stop just before the Place d’Armes, the immense plaza in front of the chateau, to reveal the stone walls of the palace stables on either side. They frame, across almost a quarter mile of plaza, the true expanse of the chateau that has been concealed up to this point. Particularly in the seventeenth century, the Place d’Armes must have seemed almost terrifying in its immense emptiness, precisely its function. Two broad avenues, nearly identical to the Avenue de Paris, converge on the Place d’Armes on opposite sides of the stables. These stables were designed as palaces to amplify the king’s magnificence. Larger and more elaborate than the palaces of most aristocratic visitors, their main, horseshoe-shaped courtyards are as large as such city squares as the Piazza del Popolo at the northern entry to Rome.

The Exterior of the Chateau on the Garden Side

The palace’s plan resembles a giant square-nosed airplane headed west into the gardens: state apartments form the nose, and apartments for aristocrats the two wings; the Marble Court corresponds to first class and the Avenue de Paris the center aisle. The contrast between the styles and materials

of the city side and garden facades of the chateau is paralleled by a contrast of forms and styles. From the east, the chateau looks less like a single building than a collection of three-story, domestically scaled, steep-roofed buildings that gradually step back to the Marble Court. The garden facade, however, has only one large setback (on either side of Le Vau's original envelope), is monumentally grand, and appears to have a flat roof (the real roof in fact slopes, but the slope is so low that it is invisible from the ground). The city facade resembles earlier French manors, but, especially as expanded by Hardouin-Mansart, the garden facade (like the contemporary East Facade of the Louvre) resembles contemporary Italian palaces more than earlier French architecture. Above a relatively undecorated ground floor with tall, roundheaded arched openings separated by *pilasters* is a richly articulated main floor. Its extremely tall, arched windows are set between pilasters like the openings below. There is a low attic floor with small windows and crowned by a balustrade and sculptures. Hardouin-Mansart enlivened the seemingly interminable, repetitive length of the garden facade—it is 2,230 lineal feet, about four-tenths of a mile long—by pulling slightly forward sections of the ground floor and setting groups of freestanding columns on the resulting plinths. His facade is frequently criticized as dull because of its repetitiveness, but it functions in the larger plan as a backdrop for the gardens: The chateau complements the gardens, reversing the conventional idea that gardens should complement or supplement a building.

The Interiors

Unquestionably, the most famous and splendid part of the palace interior is the sequence of three rooms in the projecting central section of the garden facade. All three rooms, the Hall of War in the northwest corner, the Hall of Mirrors in the center, and the Hall of Peace in the southwest corner, have the same rich palette of materials: dark reddish and white marbles, gilded relief sculptures and moldings, and frescoes. All three rooms are grand in scale, and the Hall of Mirrors, Le Brun's masterpiece, is also grand in size: 246 feet long, 33 feet wide, and 40 feet high. Le Brun modeled its decoration on reception rooms in contemporary Roman palaces, but he transformed these models into something entirely French. Seventeen arched windows on the garden (west) side of the hall, which overlook the main axis of the gardens (the Tapis Vert and the Grand Canal), symbolize the accomplishments of the first seventeen years of Louis's reign, which are recorded in Le Brun's ceiling frescoes. Identical openings on the wall opposite the windows are filled with mirrors that reflect not only the images of people in the hall, but also the setting sun over the Grand Canal. The golden rays of the sun, reflecting from the mirrors and the gilt bronze capitals on the marble pilasters that separate the mirrors, were intended to symbolize the king's radiance over his realm. The sun is a motif in many palace decorations, as well as in the plans of the city and gardens.

Three days a week, when Louis was in residence at Versailles, he held an

“apartment” in these state rooms for the courtiers, who were encouraged to drink, dance, and ruin themselves financially with gambling and fine clothes. In recent times, the Hall of Mirrors was the setting for the declaration of the German Empire (on January 18, 1871) and for signing the Treaty of Versailles, ending the First World War on June 28, 1919.

Interiors: The Chapel

Mansart and de Cotte’s chapel, its high-pitched roof sticking up above the flat skyline of the rest of the palace, is the only part that breaks its overall symmetry. Its “Gothic” plan, proportions, and structural system, which break with the classicism of the rest of the palace, were probably a reference to the **Sainte-Chapelle** in Paris, the Medieval palace chapel dedicated to King Louis IX (St. Louis), that emphasized Louis’s connection to his sainted forebear.

Interior: Private Apartments

Louis XIV and his queen each had a public apartment—attending the king or queen when they ceremonially arose in the morning and went to bed at night was a high honor—and a relatively intimate private suite of rooms where they actually slept. The formal apartments were as lavish and grand as the state rooms, the private ones slightly less so. Louis XV added a third, even more private, suite of rooms that were normal in size and more comfortably furnished. Early in Louis XV’s reign, their decorations were elegant, feminine, and ornamented with abstract, shell-like Rococo motifs. (See the entry for the **Hôtel Soubise** for a discussion of the Rococo style.) Later in his reign and in that of Louis XVI, some rooms in the private apartments were redecorated in a refined, restrained Neoclassical style. Apartments for members of the court in the south wing of the palace were transformed in the nineteenth century into a museum and a meeting hall for the French congress.

Interiors: The Opera

Anges-Jacques Gabriel’s Royal Opera, created further down the north wing from the chapel for the marriage of Louis XVI (the dauphin, that is, crown prince) to Marie-Antoinette seats 700, has splendid decorations, marvelous acoustics, and is still used for concerts.

Versailles after Louis XIV

When Louis XIV died in 1715, his great-grandson was only five years old, and during the regency, the court moved to Paris. Louis XV moved permanently back to Versailles in 1722, and the court remained there until the French Revolution in 1789. In 1792, after his grandson Louis XVI and the queen Marie-Antoinette were executed, the palace furnishings were sold at auction, many of them going to England and the United States. The palace

itself barely escaped demolition, both then and in 1837. It was in near ruinous condition by the end of the First World War, which had destroyed the French economy. John D. Rockefeller rescued the palace, and the avenue in front of it is named for him. Another series of restorations has been continuing since 1950.

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VERSAILLES: CITY AND GARDENS, VERSAILLES

Style: Baroque

Dates: 1661–1789

Architects: Landscape Architect, Andre Le Notre (André Le Nôtre, 1613–1700); architect, Jules Hardouin-Mansart (1646–1708), among others

Except for seven years early in Louis XV's reign, Versailles was the capital of France from 1682 to the French Revolution in 1789. When the city, palace, and gardens were first built, about twelve miles west of Paris, France was the richest and most powerful country in the West, and Versailles became the model for the modern capital city. Many places around the world, including Washington, D.C., emulated its innovations in architecture, painting, interior decoration, landscape architecture, and urban design. Most novel and influential of all the aspects of Versailles was how a single, geometrical, conceptual idea was used to give a sense of unity to every aspect of city, landscape, and palace. The three parts were strung in near symmetry along a central axis, an avenue, that stretched miles in each direction from the center of the palace, the real and symbolic center of power in France. Views to the horizon in each direction—over the city toward Paris to the east and over the gardens in the west—clearly implied infinite control over man and nature, respectively. City and gardens were arranged to either side of the palace in similar geometric patterns suggesting a fundamental relationship between the natural and the man-made, between God and man—or at least

between God and the king. The palace, an extremely long building that housed not only the king and his government, but also thousands of his courtiers, formed a symbolic common boundary between city and garden.

Many talented landscape architects, architects, gardeners, and artists contributed to the refinement of this scheme over several decades, the most brilliant of whom was the landscape architect Andre Le Notre. He had experimented with several of the main ideas behind Versailles at **Vaux-le-Vicomte**, where he had integrated garden terraces (*parterres*), reflecting pools, a canal, and the chateau (manor house, in this case, a palace) and its outbuildings along a single straight line (axis). Previously, for example, at **Villandry**, landscape and architecture were separate but complementary, with the gardens secondary to the manor house. There was geometrical consistency only within individual parts. Even at Richelieu (1631), an important precursor for Versailles designed by Le Mercier, town, chateau, and gardens remained distinct though interrelated entities. At Versailles, no part took precedence over the others.

A Cartesian Plan

Versailles can be visualized as being arranged along Cartesian coordinates, the x-y axes familiar from high school geometry classes. (This may be more than an analogy, since Charles Perrault, who directed the construction of Versailles for the king and his chief minister Colbert, greatly admired René Descartes, who had invented, in the 1630s), the coordinate system named for him. If the chateau is thought of as the x-axis, the y-axis defines the central avenue of the city (the Avenue de Paris) and the gardens. Louis's reception rooms were at the origin, the point where the axes cross; he would have appreciated that. Trees and shrubs were shaped into regular forms similar to the city streets and buildings on the other side of the "x-axis," and they were arranged around openings in the groves of trees similar to the city squares. This ordering of buildings and nature may seem overly rigid and artificial to us today, but when Versailles was conceived and developed, its order was seen as a manifestation of the perfect mathematical order that God was thought to have used to create the universe, including man.

The City

Versailles' population and size have remained relatively constant: 70,000 inhabitants in 1789 and about 100,000 at present, with most of the population increase in the suburbs. Although there are relatively few modern buildings in the historical center of the city, few buildings from the reign of Louis XIV survive. The original city plan has been maintained, however, with two nearly mirror-image districts arranged on either side of the broad (more than 300-feet-wide), tree-lined Avenue de Paris. To the north, the "Ville

Neuve,” the New City, was intended primarily for workers and craftsmen. It was centered around a market square and Notre Dame, now the parish church but originally the cathedral of Versailles, a rare survivor from the reign of Louis XIV. “Vieux Versailles,” Old Versailles, to the south of the Avenue de Paris, is also organized around a market square and a church, the cathedral of St. Louis, which was built during the reign of Louis XV. Two broad avenues, similar in all respects to the Avenue de Paris but at equal angles to it, converge on the immense square (the Placed d’Armes) in front of the Palace. The *patte-d’oie* (goose-foot) pattern of the three avenues was developed along paths to Louis XIII’s old hunting lodge that his son transformed into the palace. Such radiating patterns, also found in garden paths and decorations throughout the palace and gardens, became associated with the sun’s rays and consequently with Louis XIV, who was called the Sun King.

Development of the Gardens

Existing roads and paths were not the only things Le Notre and his collaborators continually refined and subordinated to their grand scheme. They also included the *parterres* that are so closely identified with Versailles, the terraces planted with flowers and shrubs in delicate vinelike patterns that Jacques Boyceau de La Baraudière and Charles Mollet had laid out for Louis XIII.

By the end of his reign, Louis XIV had expanded his father’s original 250 acres to 4,435. Le Notre’s gardens, which took up 235 acres, were extended into the Petit Parc, the “little” park that contains the Grand Canal, the Petit Trianon, and the Hamlet. An additional 14,827 acres (twenty-three square miles) in the Parc de Chasse (Hunting Park) incorporated several parishes, hamlets, and farms. Nearly twenty-seven miles of walls surrounded the two parks. Although the Hunting Park was subdivided after the French Revolution, the gardens and Petit Parc are mostly intact.

As he had at Vaux-le-Vicomte, Le Notre manipulated the sloping ground and aligned trimmed trees and shrubs with water features (reflecting pools and the Grand Canal) to play with perspective. Distances in the gardens are frequently different than they first seem, and ditches and the cross-arms of the Grand Canal appear unexpectedly across paths, creating surprise and detours. For example, the end of the canal looks like a comfortable stroll from the palace, but it is well over three miles away—four by foot, counting the detour around the cross-arms of the Grand Canal.

The path and view down the central axis of the gardens begins with steps and ramps from the water terraces directly to the west of the chateau’s center. At the bottom of the stairs is the Latona Fountain, another reference to the sun. Latona was the mother of Apollo, the classical sun god, who appears with his chariot and horses in a fountain at the end of the broad lawn, the Tapis Vert (Green Carpet) that slopes down toward

the Grand Canal. It visually continues the Tapis Vert, after which an alley of trees continues the view to the horizon at the top of the hill. Before the Revolution amputated it, this axis extended past the hilltop into the Hunting Park.

Gondolas that the city of Venice had presented the king, as well as dinghies, yawls, yachts, barges, galleys, frigates, and other types of boats, sailed on the Grand Canal for the amusement of the thousands who lived in or near the palace. A small community of sailors, "Little Venice," was established at the head of the canal to care for these boats. Today, visitors can rent rowboats.

Full-grown trees, including those that Louis confiscated from Vaux-le-Vicomte, were brought from all over France, causing one woman at court to remark that whole forests were moving to Versailles. Jules Hardouin-Mansart built a structure with large, south-facing windows under the south terrace of the chateau to protect the 2,000 orange trees and other tropical plants during the winters. Its central gallery, which is 510 feet long, 69 feet wide, and nearly as high, is larger than many churches. Even modern architects and engineers admire the magnificent, undecorated masonry of the interior.

Statues, some original and others copies of classical sculpture, were continually added along paths, but the most important ornaments of the gardens have always been the fountains. Of the estimated 1,400 original fountains, only 607 are still operational. When all were turned on, they required 220 gallons of water per second, making water supply a constant problem at Versailles. Aqueducts bringing water from area rivers and lakes proved inadequate, and in 1681, a complicated apparatus was built, long before steam or gasoline engines, to raise water 532 feet from the Seine River to a new aqueduct that carried it by gravity to Versailles where it was channeled into reservoirs, some underground and some open to the air, and from them by wood, clay, lead, and some early cast-iron pipes to the fountains. There was still never enough water to run all the fountains at the same time, and they were turned on in sequence as the king walked through the gardens. Even then, there was only enough water to run them for two hours.

The Gardens After the French Revolution

Like all living things, trees age, and the Petit Parc has been replanted. Unprecedentedly violent storms destroyed thousands of trees, many of them more than 100 feet tall, in December 1999. The entire park is being replanted again, a process that will take decades. This time, most of the trees will be maintained at the 35-foot height specified by Le Notre. As sad as it was to see the trees fall and be cut down, the park now looks much as it did when Louis XIV was young and the gardens, city, and palace were new.

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VERSAILLES: THE HAMLET (L'HAMEAU), VERSAILLES

Style: Picturesque/Romantic

Dates: 1774–1787

Architects: Richard Mique and Hubert Robert

The Hamlet is a group of a dozen charming little thatched cottages built of cob (a mixture of straw and clay), a windmill, vegetable patches, orchards, and a large lake with poplars and weeping willows. It looks like a small hamlet in Normandy, but it was built for the amusement of the queen of France. Many considered it a major cause of the French Revolution: While her people starved, Marie-Antoinette and her friends gambled and played at being peasants. This criticism is only partly valid. Marie-Antoinette was not quite the mindless spendthrift that Revolutionaries portrayed her, and the Hamlet is much more than a charming folly; it is one of the most important and serious examples of Enlightenment and, simultaneously, of early Romantic architecture.

The contrast between the Hamlet, which sits in a very natural-looking, irregular, asymmetrical corner of the park at Versailles, and the **Petit Trianon**, to which it is a pendant, could not be greater. The Petit Trianon represents classical order, mathematical regularity, and formality; the Hamlet and its park exemplify spontaneity, surprise and variety, irregularity, informality—and the Romantic ideal of the “noble savage.”

Marie-Antoinette and the Origin of the Picturesque Gardens

Marie-Antoinette was little more than fourteen years old when she arrived at Versailles on May 16, 1770, shy, spoiled, and nearly illiterate, to be married to the crown prince. She became queen in 1774, when Louis XV died. His grandson, Louis XVI, adored her and immediately gave her the Petit



Marie-Antoinette's Hamlet (L'Hameau, 1774–1787), a fake farm built in a corner of the gardens of Versailles is often cited as one of the causes of the French Revolution. It is true that the French queen played at being milkmaid while real peasants starved, but her extravagance was more a justification for French Revolutionaries than a real cause of the revolution.

Trianon so she could escape court intrigues and formality. At first timid, she gradually took over the role that Louis XV's mistresses, especially Madame de Pompadour, had played in directing the cultural life of the court. She almost immediately became interested in the debate by court nobles and intellectuals over landscape architecture that would lead to creation of the Hamlet.

A mania for English gardens was almost universal among wealthy aristocrats. The artificial, geometrically organized landscapes, the "French style" of **Vaux-le-Vicomte** and Versailles (see **Versailles: City and Gardens**) itself, had become clichéd and unfashionable. English Picturesque Gardens were a complete contrast, designed to look like the wild landscapes in paintings by Claude Lorrain and the Poussins, apparently untamed by humans. Peasants and all sorts of little buildings, many in ruin, were scattered around in them. This type of "wild and powerful" landscape corresponded to the Enlightenment love of the sublime, the awe-inspiring; and of the Romantic love of discovery and foreign places (plants were imported into France from esoteric places like Oregon). Uncivilized nature was also valued by the most admired poet and writer of the day, Jean-Jacques Rousseau, one of the fathers of Romanticism, who had a rustic cottage built for him in the park at Ermenonville, the estate of the Marquis René de Girardin, one of the first (1766–1776) to adopt the new "English" garden. Marie-Antoinette admired Rousseau, whose works she quoted, and even visited his tomb on the "picturesque" Island of Poplars at Ermenonville. Marie-Antoinette also admired the Désert de Retz, a fantastic estate adjacent to the royal domain at Marly that Racine de Monville had landscaped between 1774 and 1784. The first

schemes for creating “English Gardens” next to the Petit Trianon were made the same years. Marie-Antoinette was a leader, not a follower, of the new fashion.

The First Designs

Antoine Richard, Louis XV's gardener, advanced the first scheme, but it was too complicated and the queen found it dull. She then engaged an aristocrat, the Count de Caraman, who had created his own gardens. Finally, by 1776, the court architect, Richard Mique, and the talented Romantic painter and designer Hubert Robert took charge of the project, enlisting Richard the gardener to select appropriate plants from the botanical gardens for it; the rest of Louis XV's garden was sent off to the Jardin des Plantes in Paris. His great greenhouse was destroyed and replaced by a lake and an artificial “river.” With excavation rubble, Mique and Robert created “Snail Mountain,” a grotto, and other “natural” features. Mique designed an exquisite round Temple of Love in a Roman style for an island in the gardens and a belvedere (that served as a music salon) overlooking the “Little Lake.” The temple was finished in September 1778, and the belvedere the following year. There was originally to be a ruined temple, as at the Désert de Retz, but it was rejected as too sad.

Buildings at the Hamlet were designed to look as if they were semiruin- ed, or at least poorly maintained. They were an architectural hybrid of half-timbered cottages with thatched roofs from Normandy and farm build- ings with tile roofs and rubble-stone facades from the region around Ver- sailles. Flemish painting and the sets from contemporary plays with shepherds and shepherdesses, very popular at the time, were other influ- ences. Inside, in delicious contrast to the decaying exteriors, the decorations were sumptuous, with gold, marble, and silk. A “ha-ha”—a deep ditch in- visible from a distance—surrounded the entire garden and hamlet to keep people out and animals in without walls. Views from the fake hamlet blended without visual interruption into the countryside of real farms and churches. Real farmers and workers were brought into the hamlet to create a living painting and to complement the real peasants on the other side of the ha- ha.

The Hamlet and Contemporary Philosophy

The Hamlet was less trivial than this description suggests. It most directly imitated the Hamlet of Chantilly, which was designed in 1774 by J. F. Leroy for the Prince de Condé and inaugurated in 1775. Rousseau was a major in- fluence on Leroy and Condé, and lived at Chantilly at the end of his life. He considered it good form for princes to spend time in contemplation in a miniature rural village, in contact with their primitive selves—and with such primitives, such “noble savages,” as peasants. For Rousseau and his contem- porary writers, the unspoiled primitive was the Romantic ideal that property and civilization had ruined. Interest in the peasant house followed. It was

studied carefully during the second half of the eighteenth century and increasingly became the subject of French and Flemish painters. Marie-Antoinette was, therefore, far from the only aristocrat to have modified an estate to resemble these pictures. Farms in Normandy, in the region near Rouen, became the model for artificial hamlets because each farm function was put in a separate building. This resulted in a farm that was more picturesque than others.

Marie-Antoinette: Out of Touch or Avant-Garde?

These arguments could only be appreciated by the aristocracy, however. Peasants, even within sight of the Hamlet, were starving in great numbers, while the queen and her court lived in luxury, pretending to be peasants. Mismanagement of the economy during Louis XV's reign, a series of disastrous wars, and several years in a row of horrendous winters had impoverished France. The Hamlet became a symbol for the revolutionaries. They accused Marie-Antoinette of being so uncomprehending of her people's suffering that, when informed that the peasants had no bread, she said, "Well, then, let them eat cake." She never uttered those words, but it was important for the nineteenth century to believe the myth to justify the massacre of the royal family.

In fact, Marie-Antoinette, who had come to France spoiled and minimally educated, became at least a fairly astute patron of the arts and at least to some degree an intellectual. She supported scientific experiments at the Hamlet, and in addition to admiring Rousseau, she was an important supporter of Christoph Willibald Gluck's (1714–1787) reform of opera. She was an enthusiastic supporter of court theatricals and operas, and had Mique build a theater near the Petit Trianon where she and members of the court played and sang along with professionals. She liked playing amorous shepherdesses and innocent maidservants, and on September 19, 1780, played Colette in Rousseau's *Devin du Village* (Prophet of the Village).

It is not at all far-fetched, therefore, to see the Hamlet as a setting where Marie-Antoinette, confined as she was by court etiquette, could follow Rousseau's advice to regenerate oneself through rural life. Until the economic and climatic crisis, the queen had been beloved by the people because she typically dressed simply and would walk around Versailles and the Hamlet with her children at a time when the upper classes gave their children to servants to raise. Contrary to legend, Marie-Antoinette had far too great a sense of decorum simply to play farm girl.

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VERSAILLES: PETIT TRIANON, VERSAILLES

Style: Neoclassical

Dates: 1762–1768

Architect: Angès-Jacques Gabriel (1698–1782)

Traditionally, the ideal building is one to which nothing can be added, from which nothing can be taken away, and about which nothing can be changed without making it worse. The Petit Trianon would qualify. This most celebrated example of the Louis XVI style was actually built in the gardens of the Palace of **Versailles** for his grandfather, King Louis XV, and his official mistress, Madame de Pompadour, so that they could escape from the stultifying etiquette and intrigues of the court. Madame de Pompadour died just before the Petit Trianon was finished, and Louis XV almost never went there. It was Louis XVI's wife, Queen Marie-Antoinette, who escaped to the Petit Trianon to avoid the boredom of the court.

The King as a Private Gentleman

The Petit Trianon was relatively small for an aristocratic residence. It is square, about 86 feet on a side, though because of the extremely thick exterior and interior stone walls, not all of the roughly 7,400 square feet per floor is usable. It was conventional in number and size of rooms: a large dining room, a music room, two other small rooms for receiving and entertaining guests, and a bedroom suite on the main floor; thirteen guests rooms on the attic floor above; and formal entry on the floor below. All this was appropriate for a king who wanted occasionally to live like an upper-class gentleman instead of in the midst of hundreds of courtiers and servants. Gabriel's genius was to turn this straightforward program into one of the most sophisticated buildings of any kind in eighteenth-century France. It is the masterpiece of Angès-Jacques Gabriel, one the greatest European architects of the eighteenth century. He had succeeded his father as First Architect to the king in 1742, and remained in that position until the day after Louis XV, a connoisseur of architecture, died in 1774.

Madame de Pompadour, a sophisticated and influential patron of the arts,



Quite possibly the finest example of Neoclassical architecture in France, the Petit Trianon (1762–1768), built in the gardens at Versailles for Louis XV's mistress, Madame de Pompadour, is also the masterpiece of Ange-Jacques Gabriel.

convinced Louis XV to build the Petit Trianon. Around 1750, she had encouraged the king, who was easily bored but interested in botany and agriculture, to create a series of experimental gardens and greenhouses in a corner of the park at Versailles near the Grand Trianon, a large pavilion that Louis XIV had built sixty years earlier to entertain guests. In 1753, a temporary pavilion was built near the botanical gardens for meals. It was so successful that in 1761, the king commissioned a more permanent structure from Gabriel. Louis, who was fascinated with architecture, took a great and personal interest in the development of the plans and details. Rough construction was finished by 1764, the year Madame de Pompadour died, and the interior was decorated from 1765 to 1768. The king slept in it for the first time in September 1770, suffering at the Petit Trianon the beginnings of the disease that killed him, and he died in 1774.

How the Site Influenced Gabriel's Design

The Petit Trianon was isolated from the palace in its garden setting, but it was close to a road that led directly to the palace. The king could be driven there in a few minutes if needed. Because it was so close to the road, Gabriel had to insulate the Petit Trianon from road noise and screen it from view. Since the formal garden connecting the Grand Trianon with the Petit was

15 feet higher than the road, Gabriel extended the garden up to the new building and, with a retaining wall and a minimal amount of earth moving, created an entry court for the new building at road level, one floor below the main receiving rooms. Because of the change in ground level, the south side, which faces the carriage court, and the east side, which faced Louis's experimental gardens (which were transformed after his death), are two and a half stories high (basement, main floor, and an attic half-floor), but the other two sides are only one and a half stories high (main floor and attic half-floor). Gabriel took into account these differences in height, the functional differences of the rooms behind the facades, the view from these rooms, and the differences in landscape in front of each side in designing the four faces of the essentially cubic building as variations of the same basic composition, while making each facade look complete. That is, the shorter facades do not appear to have one floor cut off nor do the taller facades look as they had been propped up.

The West Facade

Gabriel made the west facade, toward the Grand Trianon, the most elaborate and impressive of the facades because it was preceded by a formal garden from which the Petit Trianon would be seen from the greatest distance and for the greatest length of time. Also, the most important rooms were behind this facade since they had the best views. This west facade is the only one with freestanding columns. Gabriel used the elaborate *Corinthian Order* for them. Inspired by the villas of the great Italian architect Palladio, as were so many of his fellow architects at the time, Gabriel divided his facade into three parts: a central section and two flanking sections that are set back slightly from the central section and ornamented only by the frames around the windows. There are five rows of floor-to-ceiling window-doors, sometimes known as "French windows," across the facade that define five bays in the facade. Above each of the French windows is a small, square attic bedroom window. The angle of the roof is so low that it is invisible from the ground, and the building appears to have a flat roof behind the continuous balustrade that crowns the facade.

A two-level terrace connects the ground-floor rooms, which are only slightly higher than the ground level outside them, with the formal gardens. The higher terrace is narrow and U-shaped, with two sets of stairs leading down to the rectangular lower terrace. One pair of stairs is parallel to the facade, so that a visitor, approaching the facade on axis, can walk up the stairs to the right or left and enter reception rooms on either side of the dining room through the French windows. These terraces and stairs create an effective base for the building and a transition from building to gardens.

The South Facade

Instead of gardens, the court in front of the south facade is paved with stone. The upper facade, like the west facade, is divided into five bays with

the same arrangement of windows in the main and attic floor, though since these rooms are 15 feet above the carriageway, the windows are only windows, not doors. As in the west facade, the three central bays are in a block that projects slightly in front of the side bays and is more richly ornamented, but instead of columns, Gabriel used Corinthian *pilasters* (columns flattened against a wall). Directly below the main-floor windows are five identical window-doors. This new basement floor is visually continued, with the only curves used by Gabriel in the Petit Trianon, into the side walls of the vehicular entry court. The wall on the left is the retaining wall for the formal gardens; the one on the right was a screen wall for Louis's botanical gardens. A wrought-iron grill closes the entry court from the road.

The East Facade

If there is a back side to the Petit Trianon, it is the east facade, which faced Louis's botanical gardens. It is, appropriately, the simplest and the most sober of the four facades, but it is still quite elegant. Gabriel has maintained the five-bay composition, the same exquisite proportions on this facade, and the same graceful window frames. It is superficially similar to the south, carriage court facade, except that the extensions of the ground floor to the sides are concave instead of convex, and the facade is a continuous flat surface without columns, pilasters, or projecting center section.

The North Facade

The north facade combines features of the west and south facades. Like the north facade, the center of the three sections has pilasters, not columns, but it is the same height as the west facade. There is only one terrace. It is a near copy of the closer of the two terraces from the west facade, the one with the parallel stairs. Originally, there were semiformal gardens and the greenhouses opposite this facade.

The Interiors

Gabriel's plan is as brilliant as his treatment of the exterior. Although he puts the two-story volume of the staircase from the carriage entry to the main floor to the right of the building's center, the lowest steps of the grand staircase are directly behind the center door-window of the south facade. This arrangement permitted him to create a remarkable variety of ways to enter the rooms of the main floor from the top of the staircase, where there is a short hallway that leads to a reception room on the southwest corner. This hallway turns right into a sort of balcony to the stair hall, from which one can either go into the dining room or into a suite of service rooms. To the left at the top of the staircase, a door opens onto a short hall from which both the stairs to the attic bedrooms and the royal bedroom suite are accessible. Rooms in the bedroom suite have lower ceiling heights than the main reception rooms, allowing insertion of a mezzanine level for various private rooms, for example, a small library. From the dining room in the center of

the west side, guests could go into a small salon on the northwest corner or a larger room, frequently referred to as the music room. It also had access to the bedroom suite. Some of the thirteen guest rooms in the attic are rather small (10 by 12 feet), but two are reasonably large (18 by 20 feet).

All the reception rooms were paneled in delicately carved wood. Panels in the main room were decorated with carved, usually white flowers highlighted with gold on a light green background. Painted “trianon gray” in the nineteenth century, most of the paneling has been restored. All the furniture was sold at auction after the Revolution. Some of it has been repurchased and other pieces from the period added. The most remarkable and famous piece of furniture, the “flying table” (*table volant*) from the dining room, has entirely disappeared. It was designed and built by the artisans Lorient and Gamain, and could be lowered, between courses, into the basement where the table could be reset with the next course; in this way, guests could dine without ever seeing a servant. While the table was in the basement, a rose made of metal leaves covered the opening.

The Petit Trianon After Louis XV

Louis XVI offered the Petit Trianon to Marie-Antoinette immediately upon assuming the throne. She visited often with her friends and her children. She surprised everyone by not changing one piece of furniture—she had a reputation for being extravagant—but she had the greenhouses torn down and replaced with a theater, the gardens refashioned in the English Picturesque style, and the charming **Hamlet** added to them. The Petit Trianon was always her favorite place to stay, and she was there on October 5, 1789, when the revolutionaries marched on the palace. Except for the furniture, the Petit Trianon survived the Revolution and was recently restored.

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VÉZELAY: CHURCH OF THE MADELEINE (MARY MAGDALENE), VÉZELAY

Styles: Romanesque and Gothic

Dates: Nave begun in 1120; narthex in 1140; choir rebuilt in 1215

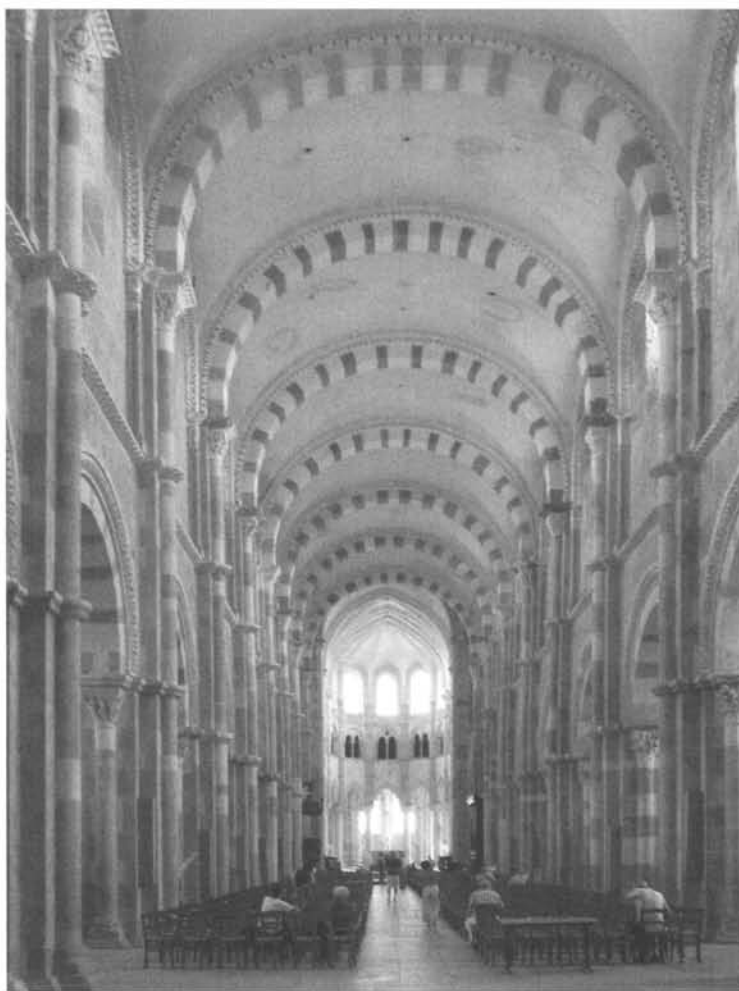
Architects: Original architects unknown, but the church was extensively restored 1840–1859 by Viollet-le-Duc

One of the Finest Pilgrimage Churches

No other French church illustrates more clearly or beautifully the differences between the Romanesque and Gothic styles of architecture—or for that matter, the transition between these styles—than the church of the Madeleine at Vézelay. Situated on a hill above the rich farmlands of the Morvan region of Burgundy, the church, abbey, and town present one of the most beautiful and picturesque Medieval sites in France. With little modern building around it, Vézelay looks much as it did several centuries ago when great numbers of pilgrims went to the church to revere what they believed were the remains of Mary Magdalene.

Its prestige and location made Vézelay the beginning of one of the four major pilgrimage routes to Santiago de Compostela, the one that passed through Limoges and Périgieux. In 1146, St. Bernard of Clairvaux called for the Second Crusade from the town, and King Louis IX (St. Louis) passed through Vézelay as he led crusades in 1244, 1248, and 1267. Pilgrims' donations made Vézelay wealthy enough to build one of the largest churches of the period, constructed and decorated during a short period (1096–1137) when Cluny, the most powerful political and religious entity in Europe at the time, directed the abbey. Some of the finest sculptors and architects of the period worked for Cluny and, consequently, at Vézelay. The sculpture above the entry to the *nave* and the *capitals* of the nave columns, masterpieces of Romanesque sculpture, make Vézelay as major a monument of sculpture as of architecture.

During the height of Vézelay's power and prestige in the thirteenth century, however, the church of Saint Maximin in Provence claimed to have the true remains of Mary Magdalene. After the pope supported its claim, pilgrimages to Vézelay largely ceased, and the abbey sank into insignificance. In 1537, control of it passed from the monks to *canons*. In 1557, a Protestant community was established at Vézelay. (Théodore de Bèze, who preached the Protestant Reform with Calvin, was born there.) It controlled the town



In the eleventh and twelfth centuries pilgrims flocked to Vézelay to revere what they believed to be the remains of Mary Magdalene. Their contributions of money and jewels helped monks build a fine Romanesque church and to begin rebuilding it the Gothic style. Unfortunately for them, a pope decided that another church had the real remains, and the crowds quit coming to Vézelay.

from 1567 to 1580, sacking the monastery and church in 1569. The abbey church was declared a parish church after the French Revolution in 1789, at which time the monastery was demolished. The church of the Magdalene was on the point of collapse when Prosper Mérimée, novelist and inspector of historic monuments in France, visited it in 1834. He commissioned Viollet-le-Duc to restore the church and part of the monastery. This restoration, one of the earliest of a Medieval building in France and the first for

the man who would become the most important scholar and restoration architect of Medieval architecture in Europe, lasted from 1840 to 1859.

The Romanesque Church

A Carolingian church had been built on the site of the present one about 855 c.e. It had been enlarged several times to accommodate the increasing number of pilgrims who came to visit the supposed remains of Mary Magdalene, which a monk had brought back from Jerusalem. Little is known about the monastic church, officially dedicated to her in 1050, because a fire completely destroyed it. Accounts that state 1,127 pilgrims died in the fire probably confused the number of victims with the date of the fire—July 27, 1120. A new church appears to have been begun immediately and must have been virtually complete in 1132, when Pope Innocent II visited Vézelay.

The new church has long been considered one of the finest of the large abbeys built along the pilgrimage routes. Its nave, 203 feet long, 35 feet wide, and 60 feet high, is the widest of any Romanesque church, and one of the longest. It is also one of the most light-filled since the architect, whose name has not been preserved, used a series of shorter, intersecting *groin vaults* instead of the more usual *barrel vaults*. Ends of the transverse semicircular vaults are nonstructural and can be filled with windows. Typically, barrel vaults extend like the roof of a tunnel the whole length of the nave in Romanesque churches (see, for example, **Saint Sernin** at Toulouse); windows cannot be introduced into their sides without lessening their structural integrity. Among the first built on a large scale in France, Vézelay's groin vaults were not well constructed and caused many subsequent problems. Because the nave is so wide, the vaults exerted a considerable thrust on the nave walls; buttresses had to be added to the exterior of these walls toward the end of the twelfth or beginning of the thirteenth century to keep the vaults from overturning them. Viollet-le-Duc had to replace these buttresses when again the church threatened collapse.

In combination, the great width of the nave and the greater than usual amount of light make Vézelay seem much more spacious than most Romanesque churches. Because of the horizontal subdivisions of the nave, it also has a more human scale than is characteristic of the period.

The Narthex Building

Around 1140, a narthex building, with an entry vestibule or foyer on the ground floor and a chapel above it, was added to the west. Almost square in plan and as wide as the entire church beyond it, it was a place for pilgrims to meet and purify themselves before entering the church itself. Its exterior, the new west facade of the church, is asymmetric. The left tower was never finished and the right tower originally had high twin bays and an octagonal spire. The facade was reconstructed around 1150, still in the Romanesque style, and an immense Gothic "pediment" of five bays was inserted into its

top center in the thirteenth century. Largely a ruin at the time, it was reconstructed by Viollet-le-Duc in the nineteenth century.

A Happy Balance of Romanesque and Gothic Styles

Around 1185, the entire east end of the church was rebuilt in the newer Gothic style. A fire in the crypt under the main altar in 1165 does not appear to have been serious enough to have been the only, or even the primary, reason. Most likely the monks wanted to “modernize” their church as many others were doing at the time. Some may find the Gothic portion “mediocre” and too heavily restored by Viollet-le-Duc, but most people find the combination of the Gothic choir and *transept* (finished in 1215) and the Romanesque nave effective and quite beautiful.

The Gothic architects used a skeletal structural system with rib-and-panel vaulting characteristic of Gothic architecture (see **Chartres** or **Reims** cathedrals), but they did not make the windows as large as they could have to balance lighting in the new choir with that in the nave. Rather than being a discordant contrast with the darker, bolder, simpler nave, the light, more delicate, more decorative choir seems to be a glowing, almost theatrical, extension of it, attracting attention to the altar. There is a sort of dialogue between choir and nave, the organic unity of the choir responding to the discrete units from which the nave is constructed: In the choir, the vaults seem to be supported by ribs that grow from the column tops like branches springing from tree trunks; each bay of the nave is divided from the next by columns and powerful, flat bands (*doubleaux*) that span across the nave from column to column. Windows in the nave are holes cut into the thick walls, whereas in the choir, they are spaces between the relatively thin, freestanding columns. The nave is also warmer in tone than the choir; white and brown stones alternate in the *doubleaux* and in the arches of the ground-floor arcade. The Gothic choir, built entirely of light stone, seems very white by comparison.

Vézelay’s Sculpture

Vézelay’s sculptures, relatively late for the Romanesque period but masterpieces by any standards, are not mere decoration; they are an essential part of the church. Like contemporary Byzantine artists, Vézelay’s sculptors were more interested in decorative surface patterns (for example, in the folds of garments, and arrangements of figures) than in the illusion of volume and space. All of the figures are, however, easily recognizable. Figures in the tympana, the semicircular areas, above the doors to the nave, are carved as if behind a transparent plane. The most important figures (Christ, in the central panel, for example) are larger than less-significant ones alongside them. This approach was an aesthetic choice and complements the architecture, though the individual quality of the sculptures at Vézelay indicates a growing independence of sculpture from architecture. (See the discussion of the sculp-

ture for Chartres Cathedral.) Column capitals in the nave are, as is typical of Romanesque architecture, “historiated,” that is, covered with scenes of people, animals, and mythological creatures (such as griffins) that tell stories or teach lessons. They are sometimes entertaining, sometimes frightening, and sometimes humorous. Their appeal is popular, appropriate to a pilgrimage church. By contrast, the capitals in the Gothic choir are abstractions of leaves.

The Restoration of Vézelay by Viollet-le-Duc

Though Viollet-le-Duc is now frequently criticized for “overrestoring” buildings, his work at Vézelay—for example, the rebuilding of the vaults in the fourth, fifth, and sixth bays of the nave—was, for the most part, brilliant given the state of restoration in France at the time (virtually nonexistent) and the urgent need for repairs (parts near collapse had to be immediately and entirely rebuilt). Sections of the huge Gothic window in the center of the facade were nearly 2 feet out of line. Nave vaults had to be rebuilt without causing a major collapse of the building, though changes he made to the vaults furthest down the nave remain controversial. For example, he reconstructed structurally sound vaults that had been rebuilt during the Gothic period in the Romanesque style of the rest of the nave. Though contrary to today’s practices, Viollet’s changes were probably an aesthetic improvement. Some of his other modifications, such as the small round windows he invented and inserted in the walls above the roofs of the chapels around the choir, are less justifiable. Viollet did, however, use a somewhat different white stone for his restoration, a practice that would accord with the modern principle that any additions or modifications made during a restoration must be obvious.

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VILLANDRY: CHATEAU AND GARDENS, NEAR TOURS

Style: French Renaissance (both building and gardens)

Dates: 1533, Restored from 1906

Architects: Architect and Landscape Architect Unknown

Villandry's gardens are unique. They were restored in the twentieth century to look much as they did when the chateau was built shortly after 1533. Gardens of every other sixteenth-century French chateau (manor) are lost or have been completely changed. Villandry's gardens are also important in providing an example of the type of gardens that preceded the great seventeenth-century French landscape architect Le Notre's masterpieces at **Vaux-le-Vicomte** and **Versailles**.

History of the Chateau

In 1533, Jean Le Breton, a wealthy financier from Blois who had supervised the construction of **Chambord** for the king, bought the little castle of Colombiers. It was situated part of the way up the sloping banks of the Cher River, a tributary of the Loire, just west of Tours. He tore down most of the castle, keeping some of the foundations and towers to build a larger chateau, which he called Villandry. Villandry was an anachronism, the last of the great chateaux built by the French court in the Loire Valley. By this date, though, the royal court had moved permanently to Paris, and the Loire Valley had become simply a charming provincial area. Marquis Michel-Ange de Castellane, who bought Villandry in 1754, considered its Renaissance style obsolete and had the facades rebuilt in the more fashionable Neoclassical style. A wing that closed off the chateau toward the river was demolished to improve the view, giving the chateau its present U-shape. Dr. Carvallo, who bought Villandry in 1906, restored it (mostly) to its sixteenth-century appearance. It is now difficult to distinguish what is original from what has been re-created, but the original facades appear to have been organized in a rectangular grid similar to the slightly earlier ones at Blois and Chambord. Villandry's facades are more regular; however, the *orders* are more accurately used on them, and corner towers have disappeared. All these changes are a consequence of the influence of architectural fashions from the north, where the court had moved.

The Gardens

Dr. Carvallo's main contribution at Villandry was his recreation of the sixteenth-century gardens, which the Marquis de Castellane had destroyed



Although a reconstruction, the gardens at Villandry are the best example in France of the Italian style of Renaissance gardens that preceded the more famous Baroque gardens at Versailles and Vaux-le-Vicomte.

and replaced with then fashionable English Picturesque gardens. (See **Versailles** for more on the English fashion.) Since few traces of the sixteenth-century gardens survived, engravings of gardens from Jacques Androuet du Cerceau's *Les plus excellents bastiments de France* (*The Most Excellent Buildings in France*, 1576–1579) were used as a basis for the recreation.

Like French architecture in the sixteenth century, French garden design—landscape architecture—was inspired by Italian Renaissance examples. King Charles VIII, his successors, and courtiers hired Italians to come to France to landscape their homes as well as design them (for example, Chambord and **Ancy-le-Franc**), and decorate them (for example, **Fontainebleau**). These Italian gardeners popularized the terraced gardens with decorative plantings (embroidery parterres) such as those at Villandry, a style they had brought with them.

Villandry's garden is conceived as a series of independent parterres, each with its own theme and related only by proximity and juxtaposition. At the more famous French gardens of Vaux-le-Vicomte and Versailles, by contrast, the parterres are linked with each other, all part of a vast unified scheme, and arranged along a strong, symmetrical central line or axis. At Villandry there are, for example, a medicinal herb garden, a vegetable garden, a parterre with fruit trees, and the kitchen garden, which is separated from the chateau by the moat. There is also the Garden of Pleasures, on a higher terrace with tall, boxwood hedges shaped in symbolic forms; and behind the chateau, the Garden of Love evokes love in all its forms. Some Medieval French customs

were retained: boxwood hedges were trimmed in silhouettes of guards for each of the squares planted in vegetables.

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VILLA SAVOYE, POISSY (YVELINES)

Style: Modern

Dates: 1928–1931

Architects: Le Corbusier (Charles-Édouard Jeanneret, 1887–1965)
and Pierre Jeanneret

An Icon of Modern Residential Architecture

Le Corbusier's Villa Savoye, more than any other single residence, symbolizes the Modern house. It is a white, undecorated, geometric, flat-roofed box that to most people looks industrial, almost more like a factory or office building than a house. Constructed at Poissy, twenty miles west of Paris, in the middle of a large open field that overlooks the Seine River valley, the Villa Savoye was the weekend home for a wealthy insurance company director and his wife, Madame and Monsieur Pierre Savoye. A photograph taken in 1931, when the house was finished, suggests how shockingly new the house must have seemed: It makes the Savoye's new automobile, parked next to it, look like an antique. The Villa Savoye still looks radically new. Like Frank Lloyd Wright's Fallingwater, the only other Modern house that has equally iconic stature, it attracts tens of thousand of visitors a year from all parts of the world.

The Architect and the Client

Le Corbusier, born Charles-Édouard Jeanneret in La-Chaux-de-Fonds, Switzerland (he had adopted the pseudonym to distinguish his activities as an architect from those as a painter), had wanted to shock the public, to create a resolutely modern house that looked as if it owed nothing to the past



Le Corbusier was unquestionably the most important modern French architect; and the Villa Savoye (1928–1931), a weekend home he designed at Poissy, west of Paris, is one of the defining examples of the Modern house. *Photo by Randy Seitsinger.*

and had been made with the latest technology. Already well known as one of the most daring “Modern” architects in Paris, Le Corbusier was in his early forties when he designed the Savoyes’ weekend villa. He had already designed some ten or more houses, including one for the Church family, friends of the Savoyes, and a large one just west of Paris for Gertrude Stein’s brother and his friends, the de Monzies. The Savoyes must, therefore, have known what kind of house Le Corbusier, assisted by his cousin Pierre Jeanneret, would create for them, though in the end, they were disappointed with the result.

The Savoyes asked for a pavilion—the house would be used primarily for entertaining—in a parklike setting that could be reached only by automobile. Views across the Seine valley from the house and of the meadow and forest surrounding it were of primary importance. The budget was generous. Le Corbusier and Pierre Jeanneret presented their clients with six somewhat different schemes to satisfy what, for an architect, were ideal conditions.

A House Is a Machine for Living In

All six schemes were based on ideas Le Corbusier and his painter-friend Amédée Ozenfant had first published in a magazine, *L’Esprit Nouveau*, between 1920 and 1925, and reassembled into the single most influential book on architecture of the twentieth century, *Vers une architecture* (literally “Towards an Architecture,” but often translated as “Towards a New Architecture”). They rejected the historical styles and emphasized the aesthetics of the machine, especially automobiles and steamships. Le Corbusier’s most famous aphorism is, in fact, “a house is a machine for living,” which is often

applied to the Villa Savoye. Sometimes translated as “a house is a machine for living *in*,” this statement is frequently used to indicate how cold and inhumane Le Corbusier’s architecture is, but the original phrase, a house is a *machine à habiter*, can simply mean that a house is, like a dishwasher, “a machine that assists one to live.” In the context of the book, Le Corbusier stressed that mere mechanical efficiency is not enough for architecture, which must “touch one’s heart,” must move a person—which machines do not do for most people. In its present unfurnished state, the Villa Savoye does, perhaps, look soulless, but so do most empty houses.

The Five Points of Architecture

Le Corbusier’s fundamental principles, which he applied nowhere better than in the Villa Savoye, are commonly known as his “Five Points of Architecture.” They may be formulated in several ways, but the essential points are the following:

- Pilotis (pilings or columns which lift the building so that as little as possible of it touches the ground).
- A roof terrace to make up for the part of a building that touches the ground, the net result being (Le Corbusier argued) as much or more open space after the building is constructed as there was before.
- A free plan, the result of using freestanding columns rather than bearing walls to support floors. As a result, non-load-bearing partitions can be placed wherever they are needed, both inside and out, to shape the building and spaces inside it.
- A free facade. The same independence of structure and space means that the facades of buildings can be “free” (of structural restraints). Instead of punching holes in the facades of buildings, as was done in historical buildings, long strip-windows or even walls entirely of glass can be used to light interiors more effectively and make them seem more spacious.
- “Regulating lines,” a system of abstract lines, assure that the same proportions are reused throughout a building to produce a coherent composition. This is an approach similar to that used by the Renaissance painters and architects whom Le Corbusier had studied all his life.

Le Corbusier also felt it important to eliminate any references to historical styles by getting rid of all decoration and reducing buildings to simple, flat-roofed geometric shapes—boxes, in effect. Instead of decorations, he used a few colored accents for mostly white walls (no wallpapers!), colors found in modern paintings of the period. Details, to be modern, should look as if they were created by machine, not by hand; windows and doors look as if they came from factories; handrails resemble the pipe railings used in garages or on steamboats. Electric lighting was exposed: bare light bulbs were hung in the

middle of rooms. Sanitary fixtures like bathtubs and lavatories were celebrated, not hidden: There is a lavatory, for example, in the entry vestibule directly opposite the front door. Exterior walls appear to be extremely thin, demonstrating that, unlike those in traditional buildings, they no longer hold up the building; the real structure, concrete columns, floats free from walls, interior and exterior. Le Corbusier arranged openings and partitions so that, instead of clearly defining one space from another, they give spaces ambiguous relationships: From a distance, it is difficult to determine what is inside and what is outside; on the inside it is difficult to distinguish where one room—if the word still has meaning for this house—stops and another begins.

The Five Points Applied in the Villa Savoye

Piloti and Roof Terraces:

The Villa Savoye's main floor is a "box on stilts," a nearly square, white box supported one story above the ground on its outer edges (on three sides) by round, freestanding concrete columns (*pilotis*). By setting back the ground floor of the Villa Savoye the width of a driveway from the piloti, Le Corbusier accomplished several things. The enclosed part of the ground floor disappears into the shadows cast by the floor above and the dark green that the recessed ground floor walls were painted, and the house appears to hover above the ground, touching it as lightly as possible, just as the clients desired (according to Le Corbusier). At least visually, the lawn seems to continue under and past the house. The second-floor and roof terraces more than replace the area taken up by the ground-floor enclosure.

Free Plan:

Because pilotis rather than bearing walls support the villa, walls and partitions could be shaped in any fashion the architect desired. Because the only way to get to the house was by automobile, the entire structure was organized around it, both functionally and symbolically. An arriving car was driven under the corner of house and along the side. Then, following the minimum turning radius of an automobile at the time, the driver turned left, still under the second floor, and stopped in front of the entry door. The driver could continue, without backing up, curving around either to the garage, also tucked under the main floor, or beyond the house. The walls of the ground floor followed this path, at first straight, then curving in a semicircle, and finally straight again. A charming but undoubtedly fictitious story recounts that Madame Savoye could not put their car into reverse, thus the need to drive continuously through the site—and house. In fact, the Savoyes had a chauffeur, whose living quarters (like the maid's) were on the ground floor of the house, next to the garage and the linen and laundry rooms. The windows to these service rooms were in the facade that greeted arriving cars. Somewhat perversely, guests enter through the service facade without ever

seeing the “main” facade—if that term (like “room”) even makes sense for the Villa Savoye.

Free Facade:

Since none of the walls of the house are structural, facades were treated as freely as the plans, with windows as large as the architect felt appropriate to the use behind them. The four faces are variations of each other, much like those of the Petit Trianon in the gardens of **Versailles**, which Le Corbusier admired. At a time when an impressive main facade was an important aspect of a middle class house, not only is the first facade the public sees utilitarian in nature, all facades are unimpressive in the traditional sense, without any moldings or other ornament. Le Corbusier wanted to shock the middle class, *épater la bourgeoisie*, to use the phrase common at the time. Le Corbusier violated another important rule of traditional, classical architecture when he placed a column in the center of the “entry” facade, directly in line with the front door. As Le Corbusier very well knew, classical rules permitted columns in the center only of “side” facades. It is obvious that he is playing games with this column, because on the interior, he moved the column to one side and paired it with a twin column so that the visitor is greeted with an entry frame, not a single column that would block the path.

Since the nonsupporting (curtain) walls could be made thin, windows were no longer holes in walls whose very thickness cast shadows. Windows could be floor-to-ceiling panes of glass in thin metal frames, in the entry vestibule and the sidewall of the ramp (another reference to the automobile) that leads from the entry up to the main floor of the house. Windows could also be nearly continuous strips of openings, as they are around the entire second level, sometimes closed with sliding-glass windows, sometimes open to terraces incorporated within the body of the house. Most of the living room wall toward the interior of the house, too, is floor-to-ceiling glass, part of which slides aside, opening onto a large, interior courtyard. The interior of the Villa Savoye was much, much brighter than that of traditional houses, and the Savoyes named their villa *Les heures claires* (the bright hours).

A play of solid and transparent walls is created. Openings closed with windows continue as openings without windows. For example, the strip window at the end of the living room is glazed, but when the slot continues across the outer wall of the courtyard, it is open. From certain vantage points, one can see through an outer glass window, through the room behind it, through an exterior courtyard, and through windows in both walls of a room beyond that. This “transparency of space” has been likened by many critics to the effects in Cubist paintings or to those of Cezanne. It upset traditionalists who saw it as, among other, things, violating the middle-class sense of privacy.

Le Corbusier said he wanted people to wonder, as they walked through and around the house—a circuit he referred to as the “architectural promenade”—why he had done certain things. Why, for instance, are there both a ramp and a spectacularly sculptural spiral staircase to the second floor in the

relatively small foyer? And why does the ramp move from inside the house to the exterior on the second floor, but the spiral stairs are continuous on the interior from the basement to the roof? Gradually it becomes apparent that the ramp is both the physical and conceptual center of the house, both symbolically—as representative of a parking garage (even the window to its side is treated like one in a parking garage)—and ceremonially. The spiral stairs, more practical, are also more “artistic.” Why is the lavatory featured like a sculpture in the vestibule? Why is there no wall between the master bathroom and bedroom? Because Le Corbusier, like many of his contemporaries, was obsessed with hygiene and fitness. The master bedroom suite—a sleeping area, an exercise area, and a large bathroom—becomes one continuous space divided only (between the bathroom and exercise/bedroom) by the bathtub, which is sculpted in the form of a person lying on his or her back. This combination of functions would still be considered unconventional, and was even more so at the time.

The combined dining and living room was just as unconventional. This large room (20 by 46 feet) is entered through the dining area, which continues without any sort of divider into the sitting area, itself open via the sliding-glass wall to the interior terrace. This terrace, which is analogous to the cloister of a monastery, is partly covered, partly open to the sky. Against the wall of the terrace that is perpendicular to the living room, the ramp, now outside, continues up to the solarium level and ends in a rectangular opening cut through the otherwise solid solarium windscreen, the only free-form curve in the house. This opening, which stands out because it is the only one that resembles a traditional, “punched” window, becomes a “landscape painting” framing a once-spectacular view across the Seine Valley from the house. (The view is now blocked by a clump of trees planted to screen the athletic field of the school that has been built next to the Villa Savoye.)

Functionalism and the Villa Savoye

Although the Villa Savoye, like much Modern architecture, is frequently described as “functional,” that is, reduced to only what is absolutely essential for it to serve its purpose, it is functional only in a poetic sense. In the utilitarian sense, it was never entirely satisfactory, and the Savoyes spent little time in the house. They liked the initial sketches, made shortly after they had contacted Le Corbusier in September 1928, better than the final house or than the several alternative solutions that Le Corbusier and Pierre Jeanneret prepared to try to reduce the exorbitant cost of the first scheme. In the end, a somewhat smaller, simplified version of the first scheme was chosen for construction, but it cost more, not less, than the initial proposal. Le Corbusier had to restore the house almost immediately after the Savoyes moved in. The flat roofs and terraces could not, it appears, be adequately sealed against rain, given the technology of the time, and leaks have continued to plague the building in subsequent restorations down to the present. Also, given the single glazing, the size and number of windows, and the lack of in-

sulation, the villa was difficult to heat. Only the kitchen and the bathrooms were truly and imaginatively functional.

From Ruin to National Monument

Hitler, who detested Modern architecture, ordered his troops stationed in modern buildings like the Villa Savoye wherever possible, knowing that the soldiers would ruin them. After World War II, Allied soldiers lived in the villa, which then became a youth club, and it was finally completely ruined when it was used as a barn. After the property was sold to the city of Poissy, the house was scheduled for demolition, to be replaced by a school. There was an international protest, and André Malraux, the French minister of culture, had the Villa Savoye designated a national historic monument in 1964, the first time a building by a living architect had been so honored in France. Le Corbusier died the following year.

The Villa Savoye was both the greatest and the last example of the Modern style of architecture that Le Corbusier developed in the 1920s. When conditions in France allowed him to design and build again, after the Second World War, his buildings, like the pilgrimage chapel of **Ronchamp** (Notre-Dame-du-Haut) or the **Unité d'Habitation** (Marseilles Block), looked very different.

Recent restorations have tried to restore the original color scheme. Surprisingly, perhaps, the house was never “all-white.” Scientific studies of paint on the few surviving original surfaces and research into Le Corbusier’s archives have confirmed many colors and their locations, but there is no universal agreement concerning all aspects of the restoration. In any case, some walls were bright blue, others painted in earth tones. Most controversial is whether or not the great curved screen of the solarium was painted a color, as a model in New York suggests. Because no one is certain, it has been left white.

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Glossary

Words in *italics* denote a term with its own entry in the glossary listing.

Abbey: A monastery (establishment for celibate persons who have taken vows) directed by an abbot or abbess; a *convent* is a monastery under the direction of a superior, a *priory* is a monastery under the direction of a prior.

Aisle: A passage or lateral division usually separated from the *nave* by an *arcade* or *colonnade*.

Ambulatory: An *aisle* used primarily for movement rather than worship; frequently used to describe the aisle that curves around the *apse* of a church.

Apse: A recess, usually semicircular but sometimes rectangular or polygonal, that contains an altar; usually at the east end of a *nave*, *aisle*, or *ambulatory*, or the east side of a *transept*.

Arcade: A row of adjoining arches supported on *columns* or *piers*. See also *Colonnade*.

Arch: In architecture and civil engineering, a curved member that is used to span an opening. It may be semicircular, a segment of a circle, pointed, or even lobed, and is usually made up of trapezoidal or wedge-shaped blocks called *voussoirs*. Extended as a horizontal surface, the arch forms a *vault*.

Architrave: See *Order*.

Baldacchino: A canopylike construction over an altar.

Baroque: A style in art and architecture developed in Europe from the early seventeenth to mid-eighteenth centuries, emphasizing a dramatic sequence of spaces, irregular forms, exaggerated proportions, abundant decoration, and a balance of parts rather than a strictly symmetrical arrangement.

Barrel Vault: A simple continuous *vault*—essentially an *arch*, usually semi-

circular in cross-section but sometimes pointed, extended horizontally. Also called a *tunnel vault*. See also *Groin Vault*.

Basilica: A building type characterized by a long central space (*nave*) flanked by side *aisles* separated from it by rows of *columns*. Basilican naves usually end in an *apse* that contains the main altar. Originally an ancient Roman building type, basilicas were used for churches from the Early Christian period to the present.

Bastide: A fortified village or small town, frequently built during the Middle Ages in southern France as a new town.

Battlement: The parapet of a fortification consisting of alternating *merlons* and crenels (the spaces between merlons).

Bay: A subdivision of a building, typically marked by structural elements such as *columns*, *buttresses*, or *pilasters*.

Beam: A horizontal structural member that spans between two vertical supports such as *columns* or bearing walls.

Buttress: A short wall that braces a main bearing wall or other support, usually built at right angles to it. Most buttresses are built directly against the wall or the *columns* that define it, but in *Gothic* churches, some buttresses are built at a distance from the wall they brace and are connected to its upper parts by *arches*, called flying buttresses.

Byzantine: A style of architecture associated with the Eastern Roman Empire and was contemporaneous with Early Christian through Gothic architecture in the West. Byzantine architecture is characterized by domes, frequently five of them arranged on a *Greek Cross* plan, and mosaic decoration.

Canon: A member of the clergy on the staff of a cathedral or collegiate church; canons are not necessarily priests or monks.

Cantilever: A horizontal structural member that projects from a vertical support; a diving board, for example, is a cantilever.

Capital: The broad, ornamented element on top of a *column* (see also *Order*).

Carolingian: The early ninth-century period when Charlemagne (Carolus Magnus) attempted to restore the Roman Empire in Europe.

Centralized Plan: A plan that is symmetrical about two or more axes; usually either a circular, octagonal, or *Greek cross* (equal-armed) shape.

Chancel: The part of a church that was, until recent times, reserved for monks and clergy; usually the eastern end of a church, the chancel typically contained the *choir* and *presbytery* (the part east of the choir that contains the high altar). Until the Baroque period, the chancel was screened off from the rest of the church by the *jube* or rood screen, most of which, beginning in the seventeenth century, were removed from French churches.

Chapter House: The room where the business of a monastery is carried out. Although it is commonly stated that the name derives from the practice of regularly reading chapters of the “Rule” governing the monastery in the room, this is questionably accurate.

- Chateau, -eaux:** A large manor house or castle; a strongly fortified castle is usually called a chateau fort.
- Chevet:** The eastern end of a church viewed from the exterior. In most churches, the chevet contains the *chancel*. In many Medieval churches, the chevet is semicircular, reflecting the *apse* and *ambulatory*, from which a series of chapels project.
- Choir:** The area of the church in front of the main altar originally reserved for the clergy and the ordained, especially monks. Until the seventeenth century, a screen wall (*jube*) separated the choir from the congregational space in the *nave*. During the 1960s, the high altar in most Catholic churches was moved closer to the congregation, in most cases past the choir, which then serves as a chapel.
- Classical (as in classical orders):** Refers to Greek and Roman antiquity. The classical *orders* were invented by the Greeks and reintroduced in architecture during the Renaissance.
- Clerestory:** Windows high in the exterior walls of a building.
- Cloister:** A covered passage surrounding an open court (atrium) that was the center of circulation and meditation in a monastery or convent. Most of the rooms of the monastery or convent could be reached from the cloister, which typically had no views of the outside world.
- Coffer:** A sunken panel, usually in a ceiling or *vault*.
- Colonnade:** A row of evenly spaced columns, which are connected with horizontal beams; an *arcade* is a special type of colonnade in which *arches* replace the beams.
- Colonnette:** A relatively thin, tall *column*; colonnettes are frequently used only for decoration.
- Column:** A vertical structural element. A *pillar* is a relatively thick round column; a *pier* is a relatively thick square or rectangular column.
- Convent:** See *Abbey*.
- Corbel:** A projecting (*cantilevered*) bracket supporting a balcony, *cornice*, and the like.
- Corinthian Order:** See *Order*.
- Cornice:** An ornamental molding that projects from the top of a wall or part of a wall, especially the part of an *entablature* above the *frieze*. Cornices are usually horizontal, although the cornice on a *pediment* (called the raking cornice) is on an angle.
- Crenel, Crenellation:** See *Merlon*.
- Croquets:** In *Gothic* architecture, decorative leaves that curve up and away from surfaces.
- Crossing:** The part of a church where *nave*, *transepts*, and *chancel* intersect.
- Crypt:** The level under the main part of a church; frequently at least partially underground.
- Curtain Wall:** The wall between bastions or towers in the defensive walls of a city or castle; also a nonstructural wall between supports, for example, in a *Gothic* cathedral or a skyscraper.

Diaphragm Arch: A transverse wall with an *arch* taking up most of its lower part and carrying the roof on its solid upper part.

Dome: A round, typically hemispherical *vault* used to cover a structure or part of it. A dome is, in effect, an *arch* rotated about its center. Since most domes cover square shapes, either *pendentives* (spherical triangles) or *squinches* (a group of progressively larger, *corbelled* arches) are used to make a transition from the corners of the square to create the circular base of the dome. During the Renaissance, *lanterns*, small windowed structures (also domed) were introduced atop the center of domes to allow light to the area underneath.

Donjon: The principal tower of a fortress; the most highly defended part of the castle, thus the place of last resort in an attack.

Doric: See *Order*.

Dormer: A window, with its own roof and side walls, that projects vertically from a sloping roof.

Doubleau, -eaux: Transverse horizontal bands on the underside of a *vault* that connect *columns* or *piers* across a *nave*.

Entablature: In classical architecture, a horizontal element consisting of three subdivisions (*architrave*, *frieze*, and *cornice*) supported by *columns* in a classical *order*.

Flamboyant: A Late-*Gothic* decorative style, whose name derives from the flamelike *tracery* in windows.

Flying Buttress: See *Buttress*.

Frieze: See *Order*.

Frontispiece: The decorated main entrance of a building; its principal entry bay.

Gallery: In a Medieval church, the second story above the side *aisles* that opens onto the *nave*. In *Gothic* architecture, the gallery eventually becomes little more than a passageway (*triforium gallery*), but in *Romanesque* and Early Gothic architecture, the galleries extend to the outer walls of the side aisles.

Gargoyle: A rain spout that sticks out past the walls of a building to throw water away from the foundations. In Medieval buildings, the ends of gargoyles are frequently carved into fantastic beasts or caricatures of the sculptor's enemies and friends.

Gothic: Refers to much European architecture, especially religious architecture, built during the period from the mid-twelfth century to the end of the fifteenth century. It represents a dramatic change in the way large buildings were constructed, and required a level of technical sophistication in construction not seen since the Roman Empire. The most characteristic detail of Gothic architecture is the pointed arch, central to the new form of construction, which in the larger churches consisted of a stone skeleton with ribbed *groin vaults*, stained-glass windows, and on the exterior, *flying buttresses* (see *Buttress*).

Greek Cross: A plan based on a cross with arms of equal lengths, it resembles the symbol for the Red Cross (see also *Latin Cross*).

Groin Vault: A *vault* formed by the intersection of two *barrel vaults* of similar shape.

Ionic: See *Order*.

Jubé: A wall separating the *chancel* from the rest of the church, usually at the *crossing*. Also called a rood screen (see also *Chancel*).

Keystone: The center stone in an *arch* or *vault*, usually the last to be put in place and without which an arch cannot stand, thus the “key” to the arch or vault.

Lantern: See *Dome*.

Latin Cross: The most common plan shape for a Medieval church in France, it is patterned on the usual Christian symbol: with a long upright that is intersected near the top by a cross-bar (see also *Greek Cross*).

Lintel: The horizontal member at the top of a door frame.

Machicolation: A fortress walkway supported on projecting brackets and usually *crenelated*; it had holes in the floor for dropping stones, boiling oil, or other unpleasant things on the heads of attackers. (See also *Battlement*.)

Mansard Roof: Although not invented by François Mansart, the characteristic roof shape with a steep lower slope and a shallow upper slope has been associated with his name since his lifetime. It was introduced and used by other architects because its steep lower slope offers more headroom than single-sloped roofs.

Merlon: The solid part of the parapet (*battlements*) around the top of a castle or fortress. Soldiers stepped behind them for protection after they had fired weapons at attackers from the openings (*crenels*) on either side.

Monastery: See *Abbey*.

Narthex: The vestibule or front porch of a church, it usually stretches across the entire front of the church. At one time, only baptized Christians were allowed past the narthex into the church.

Nave: The central vessel of a church up to the *crossing*, the nave was originally intended for worshipers who were baptized, but neither ordained nor part of the clergy.

Order: A combination of *column* or shaft (with its base and *capital*) and the *entablature* it supports (*architrave*, *frieze*, and *cornice*). The composition, syntax, and proportions of the four most commonly used orders—*Doric*, *Ionic*, *Corinthian*, and *Composite*—were defined by the ancient Greeks and Romans, and the fifth most used order, the Tuscan, was later developed by the Italians. Variations on the characteristics of the five orders remain within fairly strict limits for followers of the classical tradition. Doric is the simplest of the five orders and the only one whose shaft has no base; it has a simple, pillow-shaped capital. The Doric frieze is immediately recognizable by a series of squarish blocks, alternately triglyphs, which are decorated with three vertical grooves, and metopes, which usually are ornamented with relief sculptures. The Ionic Order is slimmer and more elegant, and the capital is decorated with volutes, spiral shapes that resemble rams’ horns. Corinthian capitals are decorated with leaves of the acanthus

plant, and Composite capitals combine characteristics of the Ionic and Corinthian Orders. The shafts of any of these orders may be decorated with vertical grooves called flutes. The Tuscan Order resembles the Doric, but its shaft rests on a base and is smooth.

Pavilion: Sections that project slightly from the main body of a building. Depending on the context, a pavilion can also refer to a small, isolated structure.

Pediment: A triangular element representing the gable end of the roof in temples; it is used at various scales above porticoes and windows in classical buildings as decoration.

Pendentive: See *Dome*.

Pier: See *Column*.

Pilaster: A flat, columnlike strip attached to a wall; pilasters may be plain or treated like any of the *orders*.

Pilgrimage Plan: Developed for churches along the pilgrimage routes in France during the eleventh century, this type of plan became customary for large churches, even for the great cathedrals, throughout the *Romanesque* and *Gothic* periods. It was designed to accommodate great crowds of pilgrims and permit them to circulate around the church to visit relics owned by the church, even as services were being held. The pilgrimage plan was based on a *Latin Cross*; the *nave* was flanked by one or two side *aisles* that extend past the *transepts* and around the *apse*. This arrangement permitted a continuous path for pilgrims separate from the *choir*. In a large church, these chapels were arranged in a line along the east side of the transepts, and in all churches built on the pilgrimage plan, they were arranged in a radiating pattern around the apse.

Pillar: See *Column*.

Portcullis: A grillelike gate or grating that could be lowered to close off entry to a fortress.

Presbytery: The part of a church containing the high altar (see also *Chancel*).

Priory: See *Abbey*.

Radiating Chapels: The chapels arranged around the circular end of the *apse* (see *Pilgrimage Plan*) on a radial plan, the center of which is the high altar.

Refectory: The dining hall of an *abbey* or monastery.

Reliquary: A container, often highly decorated, for religious relics, sacred objects such as the bodies (or body parts) of saints.

Rib: A curved structural member placed at the edges where *vaults* intersect. Ribs are characteristic of *Gothic* architecture, and were long thought to be an essential part of a Gothic skeleton, though it is no longer certain exactly what structural role they play.

Rococo/Rocaille: A delicate, elegant, graceful, sometimes elaborate, French, eighteenth-century style, mostly found associated with interior decoration. It represented a turning to the practical and feminine after the bom-

basically grand style of Louis XIV. The Rococo style was based on the asymmetrical rocaille motif, a C-shaped abstraction derived from rock and shell patterns (thus the name) in artificial grottoes popular at the time.

Romanesque: A relatively new term introduced by Henri Focillon in the 1930s to describe what had, until then, been called early *Gothic*. The Romanesque period was a result of a revived monied economy, the reestablishment of cities, and the general renaissance of culture after 1000 C.E. It was a period of rediscovery of Roman building techniques, thus the name, and of a scale of architecture not seen for nearly seven centuries. Because it was a period of experimentation and amateur building (in the best sense), Romanesque architecture is remarkably varied and vital, and in its earliest stages, has a folk quality. It is characterized by relatively thick walls, which require less expert construction than Gothic architecture, relatively small windows and consequently dark interiors, and a close connection to nature in feeling and decoration, though late Romanesque buildings tend to be technically sophisticated and demonstrate a shift to the use of highly trained architects and builders.

Rose Window: Round, wheel-like windows in the facades, both main and *transept*, of *Gothic* churches.

Rusticated: Masonry in which the joints between stones are exaggerated and in which the surface is frequently rough, suggesting stone taken from the quarry and placed without the outer surface being smoothed (dressed).

Sanctuary: The sacred part of the church usually corresponding to the *chancel*.

Squinch: See *Dome*.

Stringcourse: A continuous horizontal band, typically of stone, even in brick walls, that marks the division between floors.

Tracery: The ornamental and structural stone framework in windows, especially of *Gothic* buildings. In some cases, this ornate pattern of stone was superimposed on solid walls to decorate them, in which case it is called blind tracery.

Transept: The parts of a church that correspond to the transverse arms of the cross-shaped plan.

Triforium Gallery: See *Gallery*.

Truss: A frame composed of numerous smaller pieces that substitutes for beams or other large structural members.

Tunnel Vault: See *Barrel Vault*.

Tympanum, -a: The planar area between the *lintel* of a door and the *arch* above it. In Medieval churches, the tympanum is usually enriched with relief sculpture.

Vault: An arched ceiling structure, usually made up of stones or brick, although concrete and tiles may also be employed. Structurally, vaults are related to arches, and when built of stone, are like stone arches, made up of *voussoirs* (trapezoidal stones). The shape of vaults depends on the shape

of the arches that form their cross section. (See also *Barrel Vault*; *Groin Vault*.)

Villa: A detached dwelling, typically larger than a house but smaller than a manor.

Voussoir: See *Arch*.

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The most comprehensive general reference book on architecture, which has plans, sections, elevations, and details, as well as dimensions and pictures of many of the buildings covered in this book, is: Musgrove, John, ed. *A History of Architecture*. London; Boston; and other cities: Butterworth. Known generally by Sir Bannister Fletcher's *A History of Architecture*, the 19th edition or later is advisable because earlier editions had numerous errors. With more than 1,600 pages, it is lavishly illustrated, though entirely in black and white.

The Green Michelin Guides to regions of France are all quite useful for the tourist, because they give opening times for monuments, entry fees, and maps of the larger cities with locations of major monuments clearly marked. The guides vary in quality and accuracy, however, and not all are in English. They are frequently updated.

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<http://www.fr.encyclopedia.yahoo.com> and <http://www.encyclopedia-universelle>. Useful for both pictures and general information, but only in French.

<http://www.pitt.edu/~medart/menuglossary/INDEX.HTM>. A useful glossary of terms, especially oriented to Medieval architecture, but generally useful.

<http://www.romanes.com/>. A particularly good source of images of Romanesque and Gothic architecture.

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